A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

April 22, 1954

NTS PAGE 2

UNIV. OF MICHIGAN

B·S

Machinists' Tools and Gages

Electronic Measuring Equipment

Johansson Gage Blocks

Cutters

Hobs

Arbors

BROWN & SHARPE

AMERICA'S ONLY MICROMETERS with STAINLESS STEEL SPINDLE AND SCREW

LONG WEARING CARBIDE MEASURING FACES

B·S

Adapters

Collets

Screw Machine Tools

Ground Flat Stock

Permanent Magnet Chucks

Pumps

Vises

VISIT OUR EXHIBIT
BOOTH 1402
A.S.T.E. EXPOSITION
Apr. 26-30 at Philadelphia

Brown & Sharpe B·S

featuring . . .
AMERICA'S MOST COMPLETE LINE
OF INDUSTRIAL SMALL TOOLS

How Hot can a Jet Get?

Whoooosshh! Jet engines generate a powerful amount of heat . . . heat which, uncontrolled in flight, would cause disastrous metallurgical distortions within the delicately balanced engine. So the problem is . . . or rather *was* . . . how to provide a dependably accurate means of measuring exhaust temperatures so that the pilot might have control over how hot his jets get.

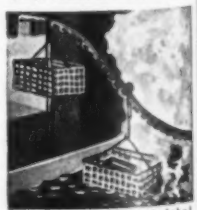
And the answer? Special wiring harnesses running from engine to instrument panel . . . harnesses now made exclusively with Hoskins Chromel-Alumel thermocouple alloys.

Yes, wherever durability and accuracy are required in a thermocouple . . . whether for jet engines or industrial furnaces . . . you'll find Chromel-Alumel *right* for the job. Extremely durable . . . highly resistant to heat, corrosion, oxidation . . . guaranteed to register true temperature-E.M.F. values within specified close limits.

That's only part of Hoskins' product picture, though. Other specialized quality-controlled alloys developed and produced by Hoskins include: Alloy 785 for brazing belts; Alloy 717 for facing engine valves; special alloys for spark plug electrodes; Alloy 502 for heat resistant mechanical applications. And, of course, there's Hoskins CHROMEL . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products.

Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.

Sparks fly better, last longer in today's spark plugs . . . thanks to Hoskins' spark plug electrode alloys.



Hot stuff for hot jobs! Hoskins Alloy 502 is ideally suited to many mechanical-structural applications.

Chromel® NICKEL CHROMIUM WIRE

HOSKINS

MANUFACTURING COMPANY

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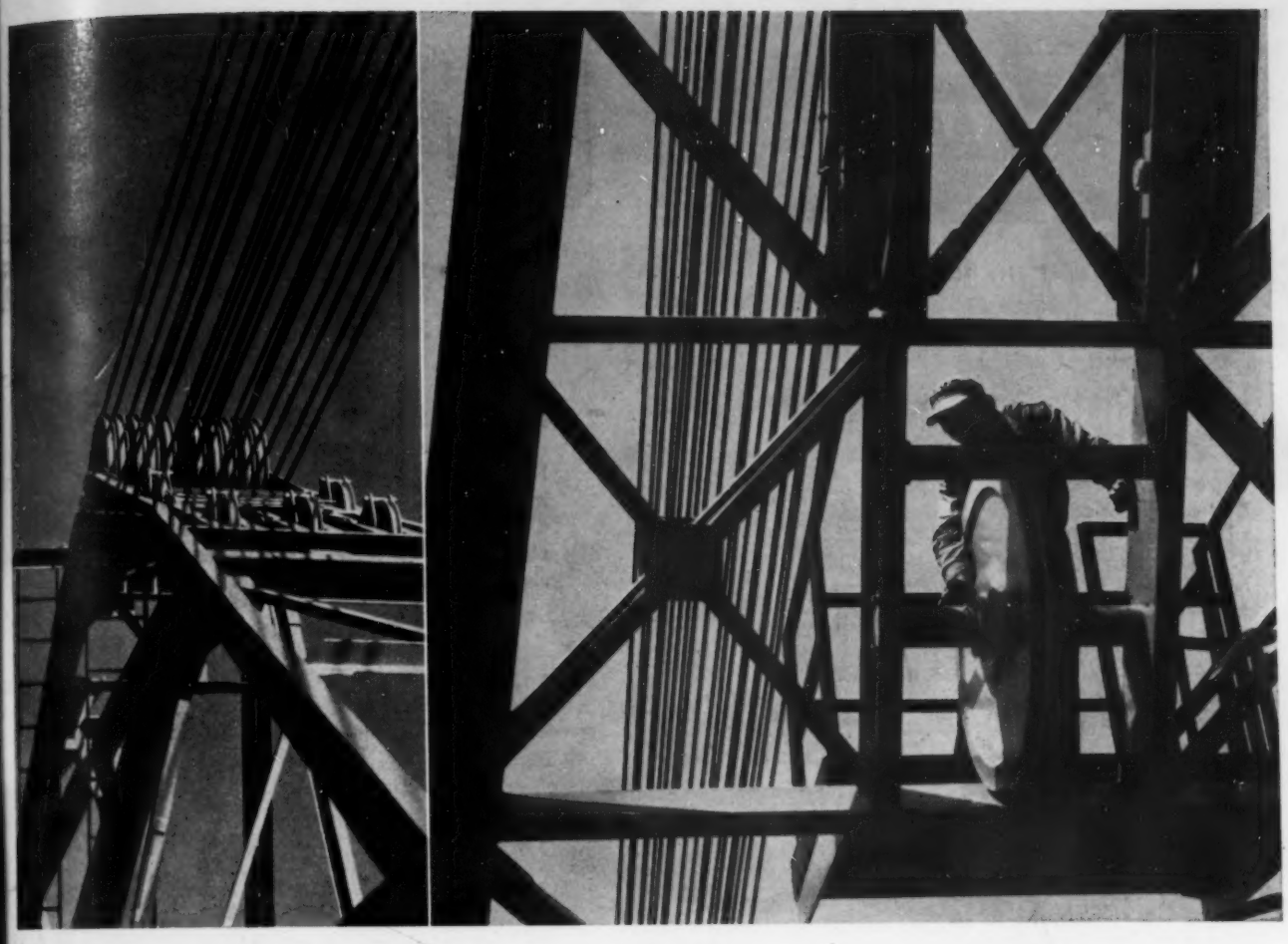

Strength at the 43 Sheave Points

The two upper photos show points high above the deck of a 50-ton floating crane. This huge equipment, including both crane and seagoing barge, was built by Wiley Manufacturing Company, Port Deposit, Md. It can be towed for long distances, even across the ocean if need be.

In view of the heavy loads to be handled, the Wiley designers foresaw the importance of rugged steel sheave wheels – sheaves that would last a long time under the heavy pressures of the cables. In making their choice, they selected Bethlehem forged-and-rolled sheave-wheel blanks, which were furnished rough-machined. This particular job required 43 sheaves ranging from 20½ to 40 in. OD.

Sheave wheels, of course, are but one of the many uses for Bethlehem circular blanks. These sturdy steel products, available in a large number of sections and sizes, are excellent for gears, crane wheels, flywheels, turbine rotors, industrial wheels, and many other parts requiring high strength without excessive weight.

If you haven't used Bethlehem blanks in your own operations, we suggest you give them a try. Sizes run from 10 to 42 in. OD, and the blanks can be furnished untreated or heat-treated, as desired.

Why not ask for details? Write or phone today, and we'll gladly furnish complete information.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

BETHLEHEM STEEL

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM FORGED-and-ROLLED CIRCULAR BLANKS

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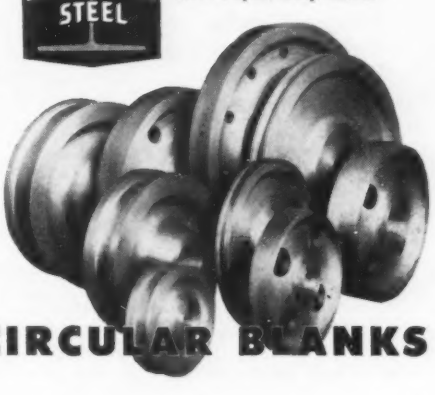

BETHLEHEM FORGED-and-ROLLED CIRCULAR BLANKS

The Iron Age

Vol. 173, No. 16, April 22, 1954

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Digest of the Week

NEWS DEVELOPMENTS

POW'S TELL ABOUT SLAVE LABOR CAMPS — P. 117
In exclusive interviews by Iron Age correspondents, POW's recently released by Russia tell about conditions in Red slave labor camps. Except for "extermination" camps, conditions are easing, though still shocking. See slowing of Red technological gains; nucleus of possible slave labor fifth column.

RADIO PROVES VITAL INDUSTRIAL TOOL — P. 120
Who said radio is dead? With no fanfare and at a walking pace, radio has been moving steadily into the industrial field for the past 2 years. This year radio men believe consumer inertia will fade, that demand for small transmitters and receivers for use in plants will show first real increase.

BRITISH STEELMAKERS SHUN SCHUMAN TIES — P. 123
Britain won't join the European Coal & Steel Community if British steel men can help it. That's made clear in the first official statement on relations between British industry and "Schumania." They fear production controls, want to avoid competitors' influence. But they'll cooperate.

FORM TRUCK BODY PARTS IN PLASTIC DIES — P. 124
Sheet steel parts for Dodge truck bodies are being formed in experimental plastic dies that cost 30 pct less than steel dies. Chrysler Corp. foresees eventual savings as high as 70 pct. And the plastic dies can be made in 3 to 4 weeks as compared to the usual 3 to 8 months. Many advantages seen.

SPOT WELD TITANIUM IN LIQUID COOLANT — P. 125
Small titanium and stainless steel ingots have been formed by resistance spot welding laminates of scrap sheets in a liquid coolant. Strength equals parent metal's and small parts or hardware may be machined from ingot. The coolant, such as water, extends possible thickness of laminate.

WHAT TO DO ABOUT REDS IN YOUR PLANT — P. 149
Communists in industry form a major management headache today. At best they are deliberate chronic troublemakers, and at worst can be spies and saboteurs. You may be getting more help from Washington, but in the meantime, check hiring procedures, brush up on labor law, and see to it that your policy is known.

in Metalworking

Special Issue

MARKETS & PRICES

RAIL RATE CUTS AREN'T CURBING TRUCKS — P. 127
Steel consumers show no sign of a significant shift from truck to rail carriers to take advantage of recent rate reductions by eastern railroads. Rail freight is now 5¢ per 100 lb cheaper than trucks but highway shipments are still favored 55 to 45 pct. ICC may peg truck rates.

SUMMER SLUMP SOURED '53 SALES RECORD — P. 136
A serious sales slump that started in mid-season 1953 tarnished the financial reports of the auto industry for the past year. After a start that indicated it would be one of the best financial years in history, 1953 ended on a gloomy note that still prevails in some segments of the industry.

ARMY COLD-SHOULDERS STEEL STOCKPILING — P. 141
Federal purchase and storage of steel products, say Army planners is (1) militarily not necessary, (2) not practicable due to changing specifications, and (3) likely to remain an academic question anyway since Congress is not inclined to vote money for this kind of stockpiling. But view is not universal.

DON'T FORGET GENERAL PURPOSE TOOLS — P. 147
With all the talk about automation, what's happening to general purpose machine tools? They're not selling well and some builders report practically no backlogs. Stock models, in some plants, are stored in rows ready for immediate shipment. F. S. Blackall, Jr., Taft-Peirce president, notes their need.

STEEL MARKET LACKS ZIP TO MOVE AHEAD — P. 255
It now appears the steel market has stabilized after reaching its bottom last month. Yet it doesn't now have the zip to start a significant upward movement. Producers point to number of "quick delivery" orders, and nearing wage talks as potential stimulants. But buying psychology is still on the downside.

BETTER FEELING USHERS IN ZINC MEETING — P. 258
Not overwhelming, but definitely healthier market conditions ushered in the American Zinc Institute's annual meeting this week. Cautious optimism and determination to better the industry's condition were noted. Group is joining forces with American Die Casting Institute in promotion program.

TOOLING FOR COMPETITION

ASTE INDUSTRIAL EXPOSITION

PROGRESSIVE DIES—P. 170
Precision and high production of major stampings are achieved by a 350-ton, 5-station progressive die setup. Setup requires minimum time for die and coil changes.

AUTOMATICS—P. 173
New machines feature speed, accuracy, low setup time, make small lot production profitable and eliminate human factor. Puts machining on pushbutton basis.

CUTTING FLUIDS—P. 177
With new hard and tough alloys, cutting fluids have increased in importance. They reduce friction, improve work quality, save on tools and dissipate heat.

PLASTIC TOOLING—P. 180
Accurate, highly serviceable plastic checking and locating fixtures are now made in 24 hr, using new techniques. Weight savings are 50 pct or more.

HIGH-SPEED MACHINING—P. 184
Better quality at lower cost favors high over low-speed machining. Tool life equals and surpasses that obtained at slower speeds. Machines must be rigid.

AUTOMATION—P. 187
Crankpin grinding, one of the toughest cylindrical grinding jobs, has been automated with a transfer-type machine. Only one man supervises the operation.

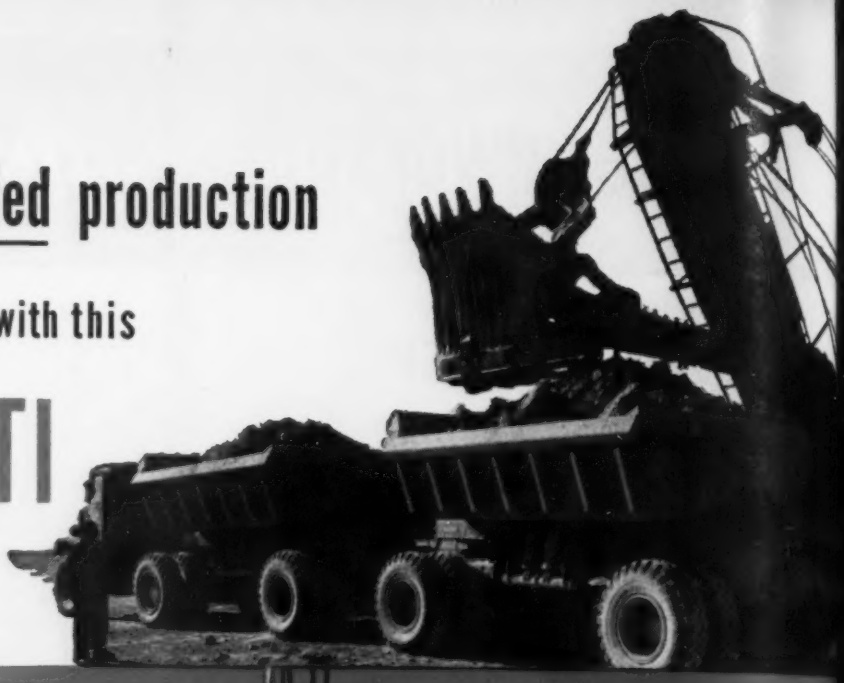
WORK HANDLING—P. 190
Devices for work handling boost lathe output. Equipment produces more and waits less, reducing floor-to-floor time. Operator can run more than one machine.

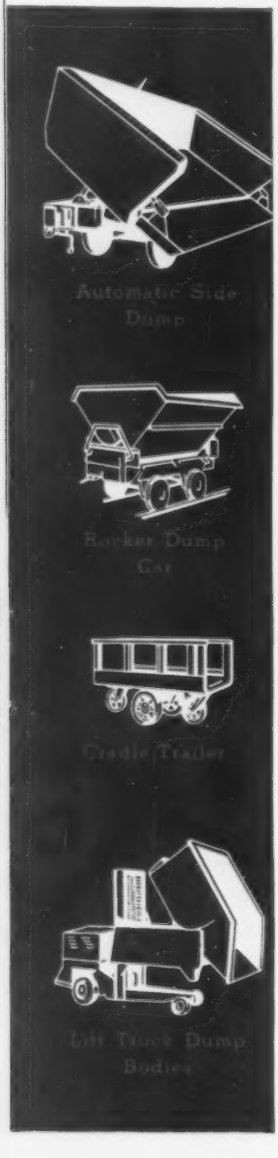
DIAL FEEDS—P. 194
Combined operations in one press, using a dial feed, increase production, improve work quality and cut floor space requirements. Simpler tools help cut costs.

SHOW PREVIEWS—P. 199
Machine tools . . . Accessories . . . Coolants . . . Portable power tools . . . Cutting materials . . . Tool grinding.

TECHNICAL PROGRAM—P. 200
Up-to-date developments and solutions to metalworking's tough problems . . . Handy memo of dates, times and places.

EASTON simplified production and improved product with this CINCINNATI Press Brake





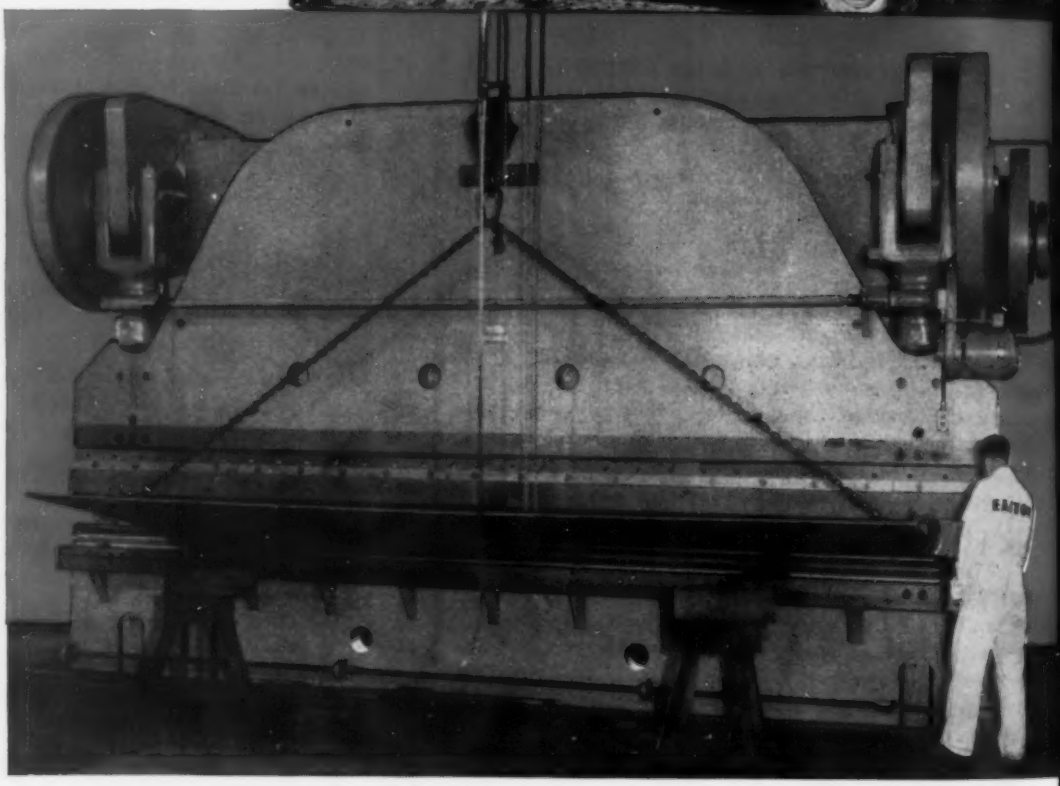


Illustration courtesy Easton Car & Construction Company, Easton, Pennsylvania.

Here a Cincinnati Press Brake is forming ½" plate for wide sections of off-highway trailers, at the Easton Car & Construction Company, makers of a large line of products for industrial transportation.

By using this Cincinnati Press Brake, some welding operations were eliminated, which improved the product, and reduced production costs at the same time.

The power, accuracy, and versatility of Cincinnati Press Brakes are reducing manufacturing costs where ever they are installed. If you form, or bend, you should investigate their possibilities.

Write for Press Brake Catalog B-4.

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Indexed in the Industrial Arts Index and the Engineering Index.

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Society of Business Magazine Editors

BPA Business Publications Audit

NBP National Business Publications

H-Bomb Overtones and Undertones

THERE never has been any question—in or out of scientific circles—of Dr. J. Oppenheimer's brilliant contribution to our atomic research and development. Security charges made against him by the Atomic Energy Commission will be upheld or discarded by the Commission's security panel.

The outcries from Dr. Oppenheimer's friends and colleagues were to have been expected. In view of President Eisenhower's pledge on security measures a review of Dr. Oppenheimer's case was also to have been expected.

Publication of the charges and Dr. Oppenheimer's answers have opened to the public vistas which are quite impressive to the average person. What seems proper and unspectacular to the cultural, scientific and educational intelligentsia does not always look that way to the man on the street.

Dr. Oppenheimer took a definite and strong stand against a crash H-bomb program in 1949. He and the committee he headed—the General Advisory Committee to AEC—primarily were to give technical advice but it appears that they went further than that.

Moral, technical, political, economic and military angles appear to have been involved in the GAC's unanimous anti-H-bomb report. The committee was composed of eight scientists, many of whom were top level educators, and one businessman. Three of the five members of the AEC in 1949 were against the H-bomb.

Lewis L. Strauss, a low high brow on the AEC in 1949, distrusted the Russians and sensed their ability to run with the atomic ball. He set up a howl for the H-bomb that reverberated around the AEC and to the White House. The explosion of an A-bomb by the Reds—long before it was expected—convinced him they were smarter than our "experts" thought them to be.

Citizen Strauss—who now heads the AEC—was the fuze which set off the H-bomb program. His views were supported by Defense Secretary Johnson, Secretary of State Acheson and eventually by President Truman who gave the go-ahead for the H-bomb project.

Americans also owe Lewis L. Strauss a debt of gratitude for his contribution to our present position in the inevitable atomic race.

Tom Campbell

Editor

and...

Not a Rough Edge in Sight

How many edges can you see i this picture? There are easily se eral hundred and in the enti structure probably thousands, perhaps millions. But regardle of the total number . . . they all rounded . . . no sharp edg . . . easy on shoe leather . and safe!

These are important factors buying grating and, by the sam reasoning, important to the gra ing manufacturer when buyi steel.

Sharon narrow strip, mill edg steel is the perfect material f grating manufacture. It comes uniform width and gauge with smooth round edge. There's n finishing required. Consequent production costs can be reduce

Wherever rough, sharp edges a a problem it pays to specif rounded mill edge strip b Sharon.

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Sharon, Pennsylvania

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Dear Editor:

Letters from readers

Industrial Security

Sir:

I have noted with interest many of the editorials which have appeared in your magazine relative to industrial security and wish to take this opportunity to commend you for the very fine support that you have given to plant protection problems through the editorials of your fine magazine.

I have occasion to address many civic, public and patriotic organizations in this area with regard to industrial security and, with your permission, I should like to use as part of my speech your editorial entitled "Industrial Security Is A Must."

C. R. LOVE
Director of Safety and Security
Eitel-McCullough, Inc.
San Bruno, Calif.

Glass Lathe

Sir:

In your Apr. 1 issue, p. 65, mention is made of a new glass lathe which has been designed for specialized glass work in laboratories and in certain types of production operations.

This item is of interest to me but we have been unable to find any further information concerning the lathe in the magazine. Is the name and address of the manufacturer available?

J. S. MILLAR
Purchasing Agent
Sylvania Electric Products, Inc.
Mountain View, Calif.

The new glass lathe was developed and is manufactured by Bethlehem Apparatus Co., 825 Front St., Hellertown, Pa.—Ed.

Measures Quenching Power

Sir:

We noted with interest the article "Simple Test Measures Quenching Power of Salt Baths" by R. F. Harvey, in your Apr. 8 issue.

We would like to receive your permission to reprint this article.

J. P. OSTERMAN
Advertising Manager
Ajax Electric Co., Inc.
Philadelphia

Water Purifier

Sir:

The following item is quoted from p. 71 of your Mar. 18 issue:

"A water purifying process recently imported from Europe may have applications in metalworking and metal producing. Silver salts used kill slime-forming bacteria troublesome in boilers and may be effective in preventing cutting oils from turning rancid."

We would like to obtain more information on this particular matter. Therefore, it would be appreciated if you could advise us regarding its source.

L. H. SUDHOLZ
Socony-Vacuum Laboratories
Brooklyn

Contact Bond & Starr, Inc., 248 Fourth Ave., Pittsburgh 22, Pa., for more details on the water purifying process recently imported from Europe.—Ed.

Tantalum Tubing

Sir:

I was very much interested in the brief news item that appeared in THE IRON AGE Newsfront page of Mar. 11.

It stated that pure tantalum made into seamless tubing and used for steam coils in heating pickle acid tanks was recently checked after 10 years' service. Wall thickness originally 0.013 in. is now 0.012 in. Long uninterrupted service has repaid original cost many times.

Where can I secure additional information on this product?

W. T. ERICKSON
Laboratory Supervisor
Revere Copper & Brass, Inc.
Clinton, Ill.

Further information regarding tantalum seamless tubing may be obtained from Dr. L. R. Scribner, Fansteel Metallurgical Corp., North Chicago, Ill.—Ed.

Scrap Handling

Sir:

We are interested in your article entitled "Engineered Scrap Service Cuts Costs, Raises Profits" appearing in the Mar. 4 issue.

Would you kindly send us two sets of tear sheets covering this article.

G. E. MAKI
Mgr., Plant Engineering
Ford International
Div. of Ford Motor Co.
Detroit

Hot Extruded Stainless

Sir:

Send us several copies of E. C. Beaudet's article "Allegheny Ludlum Hot Extrudes Stainless, High Alloy Steels" appearing in your Mar. 25 issue.

Thank you.

A. VAN ECHO
Joslyn Mfg. & Supply Co.
Fort Wayne, Ind.

Which kind of Cold Rolled Strip Steel is best for You ?

CONSIDER SHEET COIL

—if variations in physical characteristics are permissible.
—if fairly heavy oversize gauge variations are not objectionable.
—if the fabricating operations are not too complicated and do not require intricate expensive dies.
—if a fine surface finish is not essential.
—if a good base for paint or enamel is desired.
—if you do not object to some "square footage" loss due to oversize variation.
—then Sheet Coil will probably be the most economical material for the job.

CONSIDER THINSTEEL

—if you must have a high degree of uniformity of chemistry and physical properties—and precision gauge tolerances.
—if you wish to keep die wear low, no oversize gauge variations.
—if you require a fine finish or a better base for plating.
—if you want maximum yield for "most finished parts per ton."
—if you want selected tempers for maximum strength and lightest weight.
—then you'll find Thinsteel the most economical material by far.

No Argument Here.... Kenilworth Stocks Both

You can always count on Kenilworth helping you get the right steel for your requirements. Order Sheet Coil or Thinsteel and notice that each coil carries an identifying tag as pictured above. Call on Kenilworth, too, for your needs in Stainless Sheets or flat rolled Spring Steels (Annealed or hardened and tempered).

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1. Cover resists weather, oil, sun, abrasion
2. Vertical braid of strong rayon cord
3. Tube resists oil, gasoline, solvents, air, water

Ortac—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GIVING STEEL THE ONCE-OVER-LIGHTLY-

calls for ORTAC HOSE

PUTTING the finishing touch on a steel mold is a delicate operation. The mold maker must have complete freedom of movement—complete control over the grinder. That's why the G.T.M.—Goodyear Technical Man — specifies ORTAC for this exacting work.

ORTAC is vertically braided with double end rayon cord. This type of reinforcement gives it high strength, lightness and extreme flexibility. It readily responds to the slightest command, yet is an unusually durable, safe, economical hose — ideally suited to light and medium pneumatic tool service.

And that's not all. This hose can be used for a variety of purposes. ORTAC means "Oil Resistant Tube and Cover." It can handle air, water, oil, gasoline and most solvents. This one hose does the work of five. Can you use ORTAC? Contact your G.T.M. You can reach him through your Goodyear Distributor or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

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Fatigue Cracks

by William M. Coffey

Letters

The Wolf Envelope Co. of Cleveland collects letters and puts them in a wonderful little booklet which they regularly distribute. We can't resist passing along these two. The first tells about a farmer who sat down to write a pet shop to order two "whatchamacallums." He started his letter:

Dear Sirs,
Please send me two mongoose
. . .

It didn't look right, so he started again.

Dear Sirs,
Please send me a pair of mongeese . . .

That didn't look right either, so in desperation he penned a third note.

Dear Sirs,
Please send me one mongoose
H. Brown
P. S. Aw, what the heck, as long as you're sending me one, you might as well make it two.

* * *

And from Moscow, the publishers of the Big Soviet Encyclopedia sent this note of instruction to all subscribers:

To All Subscribers:

The State Scientific Publishing House recommends that pages 21, 22, 23 and 24 be removed from Volume V, as well as the portrait between pages 22 and 23. To replace these, the pages of a new text are enclosed. The above mentioned pages should be cut out with scissors or a razor blade
. . .

The Scientific Publishing House

(Editor's Note: The new pages, enclosed, included pictures of the Bering Sea; the pages to be deleted: a biography of Laventry Beria, deceased.)

Aptronyms

Our Seattle aptronym editor, Charles C. Finn, sent us some recent clippings from his famous collection . . .

Chas. says Ernest Bourbon and Ken Soda are neighbors but do not mix. Octave Champaign got in the pokey under the influence. The defeated candidate for Tax Collector in Redding, Conn., was Florence Dollar. Mrs. Robert Welcome had, as would be expected, a Welcome baby. Mrs. Basel Shaver had a little Shaver and in a Chicago hospital, on the same day, Mrs. Rita Black had a girl, Mrs. Ann White had a boy and Mrs. Patricia Brown had a girl. Very colorful day.

Chas. also takes us to task " . . . *now to get down to ser'ous matters: you do not want to get fired and when you say so it is merely a bluff so you can generate a few extra words to fill up space. I sent you the assured formula (Chas. a few months ago sent us some real good aptronyms but the editor censored them) and how did you print them? "CENSORED" All you had to do was print what was left out and you would have been fired and I might had had some interesting conversations with Post Office Inspectors . . .* "

Chas., it is not a bluff. We do want to get fired. And to prove we mean business read this *joke:*

"Did you get home from the party all right last night?"
"Fine, thanks, except that just as I was turning into my street some idiot stepped on my fingers."

Chas., we won't last long.

Puzzlers

The "column of troops and courier" puzzler returned to the fold many old puzzler friends. The answer: 6.1 mph. The winners: George A. Meyer, Victor W. Damm, Dale M. Letterman and Charlsie Burch (Mr. Letterman, please try to understand our position in these things. Please, from now on go along with Charlsie), Dr. W. B. Retallick, Robert C. Bechert and Charles W. Muller, Howard Schwartz, Donald Lasof and Mr. Rice, who we are happy to see has kept his record clean by submitting four correct answers to previous puzzlers.

. . . but Mr. Gus (USA) Alsterlund takes the prize with this answer:

"The courier will have quite a problem if he does not have a diagram of the route. The rate of speed would vary depending on whether the route represents an outline of a rectangle, triangle or circle from 2 plus to 3 mph. Or, if they double back of the point of start as far as they proceed forward the rate of speed would be zero for he could just stand there."

New Puzzler

Eustace and Angus went to a store for a bottle of refreshment and were told that the bottle and cap cost $1.05, but if purchased separately the bottle was $1.00 more than the cork. How much did they have to pay for the bottle alone?

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3. *Fumes not obnoxious*
4. *Improves steel quality*

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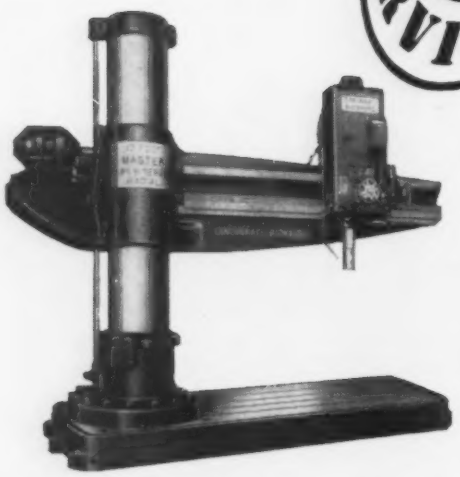
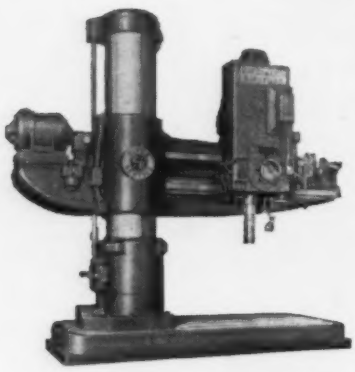
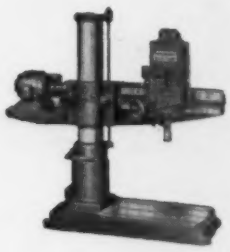


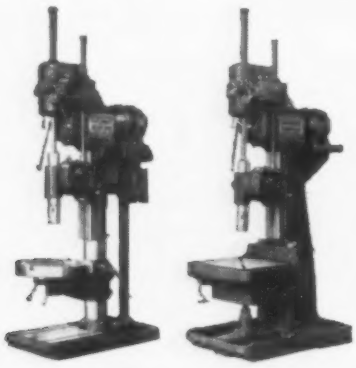
The SUPER SERVICE Master Radial Drill, as described in Circular R-22, is built in 7′ to 12′ arm lengths and in 22″ and 26″ diameter columns. This machine has 36 speeds and 18 feeds powered by motors from 20 to 40 HP.



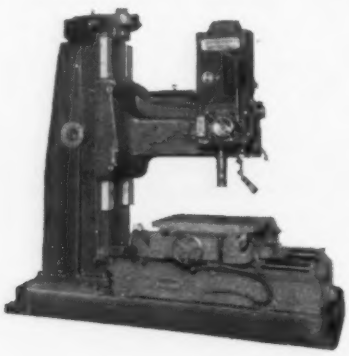
The 36-speed 18-feed SUPER SERVICE Radial Drill, as described in Booklet R-29, is furnished in 13 different standard sizes, ranging from 3′ to 8′ arm lengths and 11″ to 19″ diameter columns. These machines are furnished with 7½ to 20 HP driving motors.



The 9″ Diameter Column SUPER SERVICE Radial Drill, as described in Circular R-21C, is built in either a 3′ or 4′ arm length with 9 speeds and 4 feeds powered with a 3 HP driving motor.



The SUPER SERVICE General Purpose Upright Drilling Machines, as described in Booklet U-25, are furnished in 21″, 24″ and 28″ sizes. From 8 to 12 speeds and 4 to 9 feeds. The machines are powered by either 3, 5 or 7½ HP motors.



The new SUPER SERVICE Precision Drilling Machine is especially suited to operations in conjunction with an automatic spacing table. This 36-speed 18-feed 15 HP motor machine is more completely described in Circular FH.

The SUPER SERVICE High Production Manufacturing Type Uprights have many of the advantages of the general purpose drilling machines but, due to their simplified construction, they are much more economical. They are furnished in 21″, 24″ and 28″ sizes with 3, 5, 7½ or 10 HP driving motors. Booklet U-27 will furnish you more complete details.

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THE CINCINNATI BICKFORD TOOL CO.

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Dates to Remember

Meetings

APRIL

AMERICAN GAS ASSN. — Distribution, motor vehicles and corrosion conference, Apr. 20-23, Mount Royal Hotel, Montreal. Association headquarters are at 420 Lexington Ave., New York.

NATIONAL SCREW MACHINE PRODUCTS ASSN.—Industry national meeting, Apr. 21-23, Statler Hotel, Detroit. Association headquarters are at 2860 E. 130th St., Cleveland.

LEAD INDUSTRIES ASSN. — Annual meeting, Apr. 22-23, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

FARM EQUIPMENT INSTITUTE — Spring meeting, Apr. 23-24, Biltmore Hotel, Atlanta, Ga. Institute headquarters are at 608 S. Dearborn St., Chicago.

EXPOSITIONS

AMERICAN SOCIETY FOR METALS—Apr. 22-24, Hotel Seneca, Rochester, New York, Society headquarters are at 7301 Euclid Ave., Cleveland.

METAL POWDER ASSN.—Annual meeting, Apr. 26-28, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

AMERICAN SOCIETY OF TOOL ENGINEERS — Annual meeting & biennial Industrial Exposition, Apr. 26-30, Philadelphia. Society headquarters are at 10700 Puritan Ave., Detroit.

AMERICAN FOUNDRYMEN'S SOCIETY —Annual Foundry Congress & Show, May 8-14, Public Auditorium, Cleveland. Society headquarters are at 616 S. Michigan Ave., Chicago.

AMERICAN MANAGEMENT ASSN. — Manufacturing Conference, Apr. 26-28, Statler Hotel, Cleveland. Association headquarters are at 330 W. 42nd St., New York.

ASSN. OF CONSULTING CHEMISTS & CHEMICAL ENGINEERS, INC.—Apr. 27, Belmont Plaza Hotel, New York. Association headquarters are at 50 E. 41st St., New York.

GRINDING WHEEL INSTITUTE — Spring meeting, Apr. 28-May 1, The Homestead, Hot Springs, Va. Institute headquarters are at 2130 Keith Bldg., Cleveland.

MAY

ANTI-FRICTION BEARING MANUFACTURERS ASSN., INC.—Annual meeting, May, Westchester Country Club, Rye, New York. Association headquarters are at 60 E. 42nd St., New York.

AMERICAN STEEL WAREHOUSE ASSN. — Annual meeting, May 2-4, Drake Hotel, Chicago. Association headquarters are at 442 Terminal Tower, Cleveland.

NATIONAL ASSN. OF SHEET METAL DISTRIBUTORS—Spring meeting, May 2-4, Roosevelt Hotel, Pittsburgh. Association headquarters are at 1900 Arch St., Philadelphia.

NATIONAL TOOL & DIE MANUFACTURERS ASSN.—Spring meeting, May 2-4, Statler Hotel, Washington. Association headquarters are at 907 Public Square Bldg., Cleveland.

ELECTROCHEMICAL SOCIETY — Annual spring meeting, May 2-6, La Salle Hotel, Chicago. Society headquarters are at 235 W. 102 St., New York.

SCIENTIFIC APPARATUS MAKERS ASSN.—Annual meeting, May 2-7, The Broadmoor, Colorado Springs, Colo. Association headquarters are at 20 N. Wacker Drive, Chicago.

ASSN. OF IRON & STEEL ENGINEERS —Spring conference, May 3-5, Bellevue-Stratford Hotel, Philadelphia. Association headquarters are at Empire Bldg., Pittsburgh.

CONCRETE REINFORCING STEEL INSTITUTE — Annual meeting, May 3-8, The Boca Raton Hotel, Boca Raton, Fla. Institute headquarters are at 38 S. Dearborn St., Chicago.

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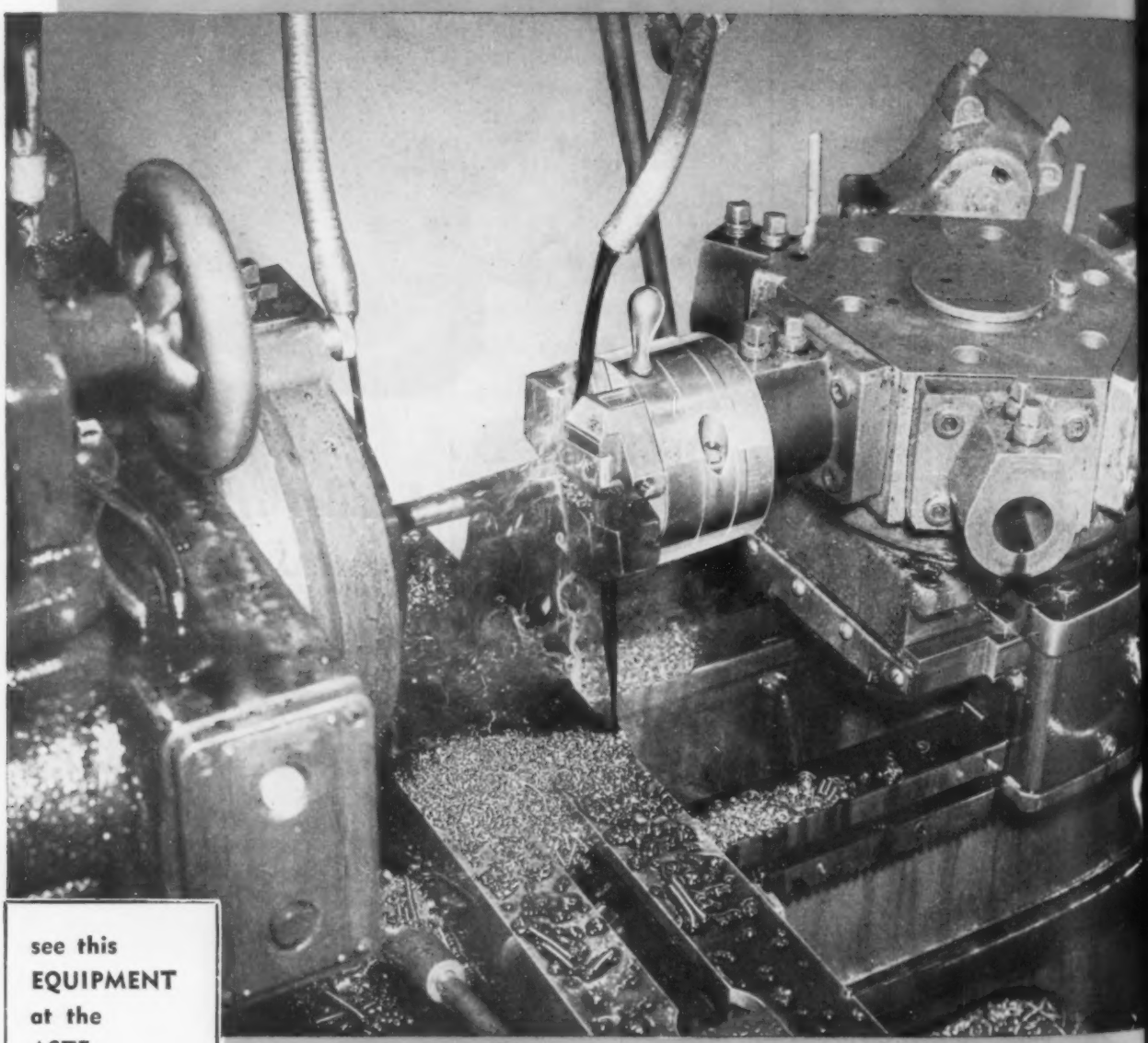

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at the
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BOOTH 1738

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the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

LOWER COSTS AND FASTER PRODUCTION ON DIE SINKING operations are claimed for a hydraulically operated tracer attachment for use on die sinking machines. Tracer eliminates need for cherrying cutters and attachments, permits use of ball nose, shank type cutters.

TWENTY VERSIONS OF GAS TURBINES are in test cars of one automaker. A second company which recently ordered basic equipment for its new piston line has specified that important elements be capable of being switched to turbine parts at any time.

BUT DON'T SELL AUTOMOBILE PISTON ENGINES SHORT--despite recent spectacular gains in gas turbines. Piston engine designers have been working, too. They haven't announced their plans but claim to have several important new developments in an advanced stage.

SOUNDNESS OF FORGING INGOTS can be determined rapidly and reliably before forging with a recently developed ultrasonic method. Applicable to medium and large sized forgings, the test helps cut scrap, permits revision of forging procedure to suit ingot.

A LIGHTWEIGHT PHENOLIC FOAM SOLID quickly produced from liquid resin is being tried in Navy boats because of its buoyancy. It's also being used as a structural reinforcement in airplane tail sections. Cost of the unfoamed resin is about 50¢ per pound.

A NEW POWER STEERING UNIT of simplified design and lighter weight will appear soon on a major automotive line. Chief components will be fitted into a space saving tubular housing around the steering column.

A NEW CARBURIZING STEEL designed for high hardenability of the case, minimum distortion on quenching and optimum machinability has attracted attention of automotive metallurgists. The high molybdenum-low manganese carburizing steel is being considered as a possible substitute for SAE 8620 and 4620.

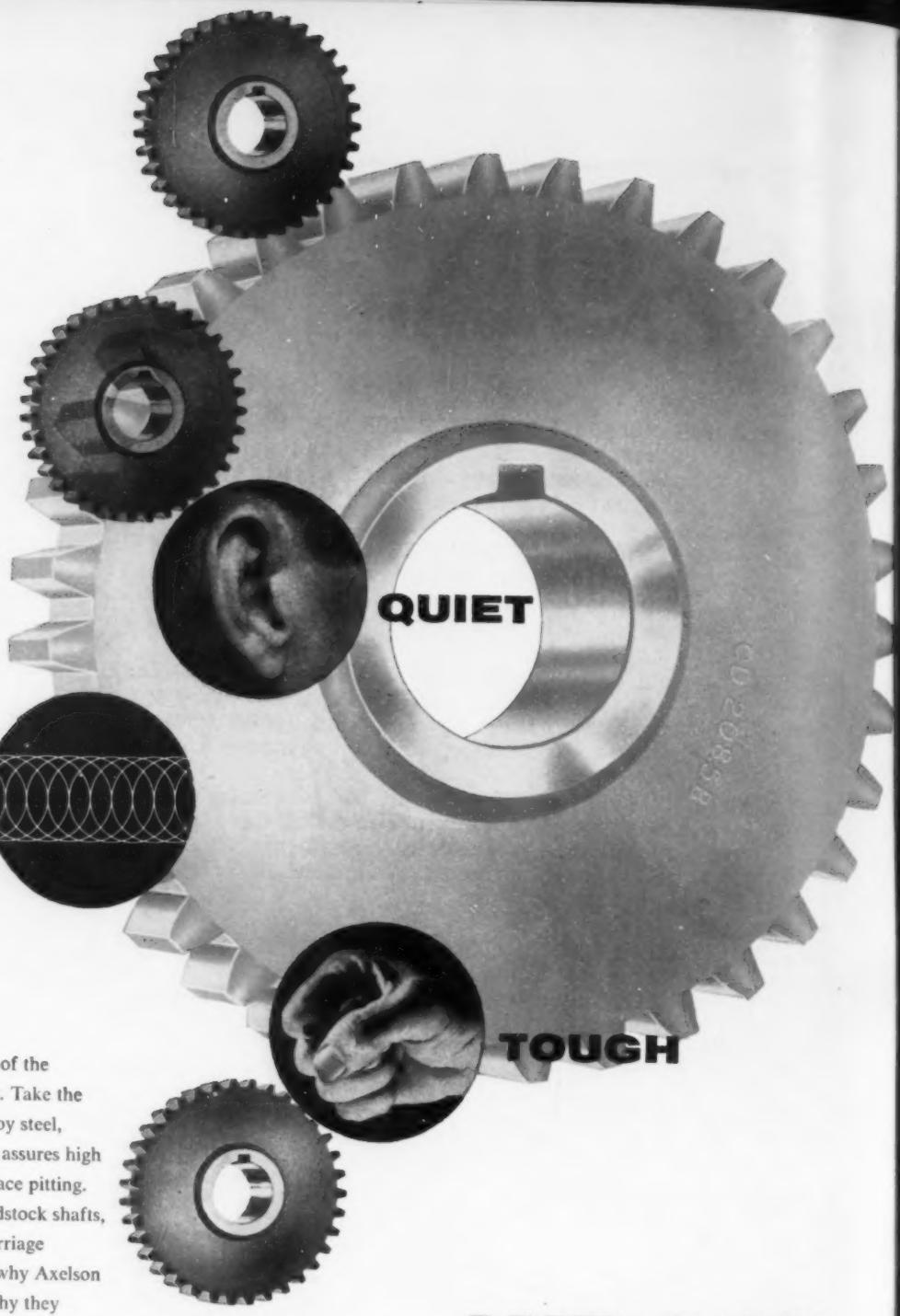
MAINTENANCE OF AUTOMATION CONTROL SYSTEMS will be simplified with wider use of transistor-type control elements. Silent, static components will have no exposed moving parts or contacts.

A COMMERCIAL CONTINUOUS CASTING UNIT will probably be ready for unveiling next month. About 30 test runs have been made and the few remaining kinks, largely mechanical, are being eliminated. Radioactive cobalt will be used for internal inspection.

MOLYBDENUM DISULFIDE is being used on auto engine tappets with good results one company reports. The compound adheres tightly to the metal, assists in break-in and acts as a lubricant.

ZIRCONIUM METAL POWDERS are being produced for use in vacuum tubes and as starters for photo flash bulbs. Material is supplied in minus 200 mesh size and is shipped under water.

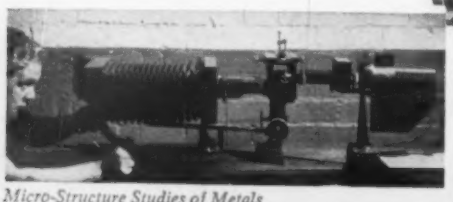
EFFORTS TO REDUCE STEEL INVENTORIES by manufacturers are hampered by premature delivery from mills. Producers are also shipping overruns in excess of normal tolerance.



Metallurgical control at Axelson is one of the important keys to Axelson lathe quality. Take the headstock gear, for example. Heavy alloy steel, *case-hardened* the way Axelson does it, assures high resistance to wear, to shock and to surface pitting. Other hardened lathe parts include headstock shafts, headstock and tailstock spindles and carriage bedways. This is one important reason why Axelson lathes are both rugged and accurate—why they maintain their precision for long periods even under the heaviest work load. Axelson is the master of meticulous detail. Below, a few of the check points in the Metallurgy Department.

AXELSON LATHES

Hardness Testing



Micro-Structure Studies of Metals

Case Hardening

Carbon Content Analysis

16" Precision Tool Room Lathe

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ACCESSORIES • ORDNANCE MATERIEL • UNISHELTER RELOCATA
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(MINE, ORE, CANE, INSPECTION) • UNISTRUT METAL FRAM
WEED BURNERS • BRICK & TILE MACHINERY • CANE LOAD

LATHES: ENGINE • TOOL ROOM • HOLLOW SPIN
GAP BED • PETROLEUM PUMPING EQUIPMENT
DEEP WELL PLUNGER PUMPS • SUCKER RODS •
DRAULIC PUMPING UNITS • AIRCRAFT COMPONE

Location of Russia's 175 Slave Labor Colonies and Concentration Camps.

POW's Tell About Red Slave Labor Camp

In exclusive interviews with Iron Age correspondents they describe life in Soviet slave camps . . . Before releasing them, Russians warn prisoners not to talk.

"I was put into what was called the 'thirty-year' car . . . Into a compartment for 4 they put 16 of us . . . We were on our feet, pressed, I would even say bound, to one another, without the opportunity of making the slightest movement, sleeping on our feet, performing all our needs on our feet, dying on our feet . . .

"How many more died in the 5-day journey from Rostov to Moscow without the compartment door being opened? I do not know. It was only at Moscow that we found we had carried along with us two dead persons, when the bodies pressed one against the other separated and we saw two among us separate and fall with the rigidity of a corpse.

"How could we detect the odor of bodies in the midst of the incredible stench that emanated from this human paste?"

This is the description "El Campesino" (Gen. Valentin Gomez), one of the Loyalist leaders in the Spanish Civil War, gave of his trip to a Moscow prison after being arrested by NKVD at the close of the War. *From La Vie et la Mort en U.S.S.R.* by Gen. El Campesino.)

It seems fairly typical of the treatment given millions of Russians, POW's and non-Russian civilians (including foreign Communists) put in slave labor camps.

And life for those sentenced to the infamous "extermination" camps is no better after their trip. AFL's Free Trade Union Committee, the U.N. and U. S. State Dept. have received testimony and documented evidence of the terrors of these camps; have seen proof that camp sentry dogs are often fed more than the inmates, know of the impossible production norms on which food allotments are determined; have heard stories of prisoners frying rats over barrack stoves in order to stay alive.

But from interviews with POW's recently released by the Russians,

Iron Age Sources

Most of the information in this article on Soviet slave labor is based on interviews by IRON AGE correspondents of German and Austrian POW's recently released by the Russians. One of the correspondents was in an extremely good position to obtain information since one of his brothers and a cousin had served in slave labor camps.

Among other sources were the Free Trade Union Committee, AFL, the United Nations, U. S. State Dept.

JUSTICE—Soviet Style

Report on the following legal proceeding is from records of the Russian "People's Courts."

June 5, 1942. The People's Court of the First Precinct, Volsky District, Saratov Province.

Chairman—Koblova

Peoples Jurors—Romanov, Kurguzova

With the participation of the attorney, Kozlov

Secretary—Goloveshko

THE COURT HAS ESTABLISHED THAT:

On May 11, 1942, 8 a.m., the citizen Kuz stole one loaf of 65 pct bread at the bakery.

The defendant pleaded not guilty and explained that he gave no bread to citizen Poshelutny and that there could have been a shortage due to a discrepancy in the scales. But this circumstance is disproved by the testimony of the citizens Zotov and Kirey.

The witness Zotov declared that he saw citizen Kuz giving the bread to citizen Poshelutny.

It must be noted that white bread is sold in the stores on the prescription of physicians, and that citizen Poshelutny requested the manager of store No. 5 to confirm the fact that he received the bread in the store under her management, which was corroborated by the witness Comrade Zubkina at the preliminary investigation.

The witness Kirey confirms that the load delivery was short one loaf of bread.

On the basis of the above, the Court has found citizen Kuz guilty . . .

SENTENCE

Citizen Kuz, Mikhail Mikhailovich, . . . to one year of imprisonment, without deprivation of rights. . . .

IRON AGE correspondents learned that living conditions in the regular slave labor camps vary tremendously from place to place. For some they were hell, while others described their treatment as "not too bad," though it would still be shocking by Western standards.

Life in the labor camps has been improving gradually since 1947 as the food and clothing shortage throughout Russia eased. Some of the POW's said living conditions were just about the same as they are for many "free" Russians.

This seems logical, since the Russians regard their slave labor force (estimates of its size range from 3 million to 20 million) as a valuable asset.

Most of the slave laborers serve a 5-year sentence, work about 10 hours a day. Guards enter the camp only about three times a day for roll call. Everything else is left up to the self-organization of the slave laborers under their own boss who is often a common criminal. Life of the slave laborers depends largely on the way the labor boss wants to run the camp. He is an absolute autocrat, backed by the Russians.

Camp sports are usually permitted one afternoon a week, and the workers have one other afternoon a week without work. Men and women are put in separate camps; homosexuality is extensive. In some of the slave labor camps workers are granted short leaves to go to neighboring villages.

Escape is virtually unknown. Punishment is severe, supervision of frontiers strict, and many of the camps are located in Siberia which makes it almost impossible to leave. In addition many of the Russian slave laborers are too fatalistic to make much of an effort.

Apathy of the Russian inmates came as a complete surprise to most of the POW's. But slave labor has been a part of the Russian system since the time of the Tartars, and indoctrination under the Communists has been so thorough that most of the Russians believe the Party is always right; that they deserve whatever punishment they get.

Move Into Agriculture

Naturally the slave labor force is in many ways inefficient, but it nevertheless supplies Russia with a vast labor force which has become an extremely important economic asset.

Work of the labor force is used about as follows: in industry, 15-20 pct; agriculture, 20-25 pct; the rest in construction, mining, public works. This ratio has been changing in recent years as in 1948-49, 35-40 pct of the slave labor force was used in industry and only 3-5 pct in agriculture.

Many of the POW's indicated the Soviet Union may not be able to keep up the pace of its startling industrial development of the last 10 years. They pointed out the Russians had relied heavily on the highly skilled slave labor of prisoners of war and well-trained civilians from Austria and East Germany to accelerate its industrial revolution.

Can Russians Hold Pace?

Having exploited the knowledge and technological skills of this slave labor force to the utmost, the Soviet now has a large force of well-trained Russian technicians.

This group will enable the Russians to keep their relatively modern industries operating, but the POW's doubt the Russians' ability to continue their recent rate of improving production techniques.

Result is they believe the technological gap between Russia and the West which has been narrowed considerably during the last 10 years, could widen again as the West continues to progress while Russian technological development slows.

This view, of course, may be colored by a tendency of POW's to over-emphasize the work they did while in slave labor camps.

POW's say the best way to get along in a Soviet labor camp is to make the Russians think you're an engineer, mechanic, technician or doctor. Other rules: Never admit you can speak more than one word of Russian; keep your mouth shut.

POW's talking to IRON AGE correspondents indicated the possibility that former slave laborers might form the nucleus of a fifth column inside Russia.

Many of the slave laborers are forced to remain in areas near the camps even after they have served out their sentences. Returning POW's say some of these remote communities are becoming surprisingly independent and are under less control than the average Russian village.

Some of the POW's speculate that these groups might provide an element of danger to the Soviet in event of war or a serious internal crisis.

Russians Give Warning

The POW's also intimate that the U. S. Government may be missing out on a lot of valuable information that would be available from released POW's.

On leaving Russia all former prisoners are warned not to say anything; that if they talk, other slave laborers won't be released. Yet, in interviewing ex-POW's, U. S. officials apparently make it obvious they are keeping files on the information given, complete with names and places.

Watch for Spies

Afraid that the Russians may learn that they've talked, many POW's won't say anything. One of the POW's contacted by IRON AGE correspondents said he had deliberately told a "very interesting but totally false" story so that his report could not be traced.

Just recently there was an incident which has added to the fear POW's have of talking freely:

A Russian Army captain seemingly deserted and went over to West Germany. He was employed by the U. S. Central Intelligence Agency (CIA) to train anti-Russianagents and interview returning POW's.

It has since been learned that he was planted by the Russian counterpart of the CIA and sent file copies on interviews with POW's, along with other vital information to Russia.

Despite the recent release of many slave laborers, there is no indication that Russia has any intention of abandoning its shocking slave labor system. They derive too many advantages from it economically and politically.

How Important Is Slave Labor to Soviet Economy?

Official Soviet documents for 1941 showed that slave labor that year was scheduled to produce:

Chrome ore: 165,000 net tons (40.5 pct of total planned output for the whole U.S.S.R. in 1941).

Coal: 5.87 million tons (2.8 pct of total).

Commercial timber, firewood: 45.4 million cu yd (11.9 pct of total).

Furniture: 14.49 pct of total.

Shoes: 14.7 million pairs (2.1 pct of total).

Wide-gage cross-ties: 10.5 million (22.6 pct of total).

It's A Crime . . . in Russia

"Article 59. Any act which, though not directly aimed at overthrowing the Soviet regime and the Workers' and Peasants' government, nevertheless leads to the disturbance of the smooth functioning of the organs of the government or of the national economy and which is accompanied by resistance to the organs of government and hindrance of their activity, by disobedience to the laws or by other activities causing a weakening of the force and authority of the regime, is considered a crime against the system of government . . . "—Criminal Code, R.S.F.S.R., State Publishing House of Juridical Literature, Moscow, 1950.

Efficiency:

Trained men, mechanization get more kw-hr from coal

American industry's efficiency in use of fuel, heat and energy surpasses that of Great Britain for four basic reasons a team of visiting British fuel specialists decided after a recent trip through U. S. industrial plants.

The British experts were seeking more efficient methods of obtaining energy from their country's rapidly dwindling coal supply.

One example of efficiency in conservation of fuel was the American utility industry where, in 1920, it required on the average 3 lb of coal to generate 1 kw hr of electricity.

By 1952, the coal requirement for power generation had been cut to 1.1 lb per kw hr, according to National Coal Assn., and in some of the newest plants the requirement is about three-quarters of a lb per kw hr.

Illustrating savings possible through increased efficiency, Philadelphia Electric Co. has reported that "had turbine and boiler designs remained at the 1930 level of efficiency" that the 1952 fuel bill "would have been 50 pct greater."

Efficiency of industry's coal consumption has had its counterpart in the mines where productivity has risen sharply due to greatly increased mechanization. National Coal Assn. figures show that in 1953 output per man reached 8 tons per day. In World War II it ranged between 5.12 and 5.78 tons and in 1934 was only 4.4 tons.

A report by the visiting fuel specialists indicated they found these main factors to be the basis for the U. S. superiority:

1. Quickness of American industry to adopt new ideas and to scrap inefficient equipment;

2. Recognition of chief engineers as part of the executive personnel, thereby achieving a higher standard of engineering competency;

3. Greater development in the United States of instrumentation and use of automatic boiler control;

4. Elimination to a large degree in the United States of costly standby equipment.

RADIO: Proves Vital Plant Tool

Industry finds many uses for combination transmitters-receivers . . . Speed output, materials flow . . . Aid police, medical, production personnel—By *K. W. Bennett.*

Who said radio is dead? With no fanfare and at a walking pace, radio has been moving steadily into the industrial field for the past 2 years. This year, radio men believe consumer inertia will fade, that the demand for small transmitters and receivers for use in industrial plants will begin its first really appreciable increase.

The use of small "transceivers," radio units that can both receive and transmit messages, is old hat to soldiers, firemen, policemen, civil defense, pipeline patrollers, and the forestry service. Of more recent date is the use of small, portable transmitters (weighing anywhere from 14 to 40 lb) on switch engines and trucks in steel plants, in barge towboats, and in railroad switching yards.

Route Lift Trucks

Beginning at one-half-watt power output, midget transceivers can be purchased with operating ranges of anywhere from 1 to 50 miles, depending on power output and antenna height at the main or base station—usually the main plant office of the company using radio.

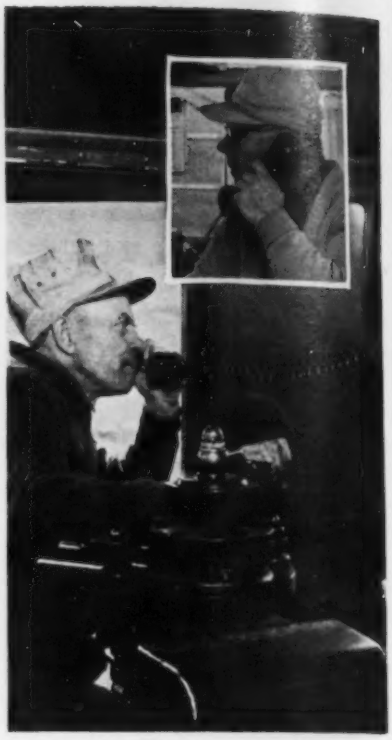
A peacetime version of the wartime handy-talkie with a 2-3 mile range is being used to route forklift trucks in several plants, for instance. Timken Roller Bearing has a similar setup. Like a big city taxicab, the lift truck can not only be dispatched from a central office, but the truck operator can report in when he's being delayed.

Worth The Price

The handy-talkie units, looking a lot like conventional telephones, operate in a low power range and are subject to less stringent licensing requirements than are the larger hookups of 10 to 60 watt output, but both are fairly simple to license. At least a few plants are beginning to purchase sets with power greater than 60 watts to tie in company plants at considerable distances apart.

Priced from $200 to $500 per unit, the sets aren't cheap. But properly used, they can be a money-saving investment. One railroad reported savings up to $3600 per month when car checkers were given portable transceivers to report car numbers to a central dispatcher as the checker walked down the line inspecting door seals.

Small transceivers received their first impetus in plant protection systems. International Harvester, Inland Steel, the University of Illinois, to mention a few, are using small transceivers in autos.

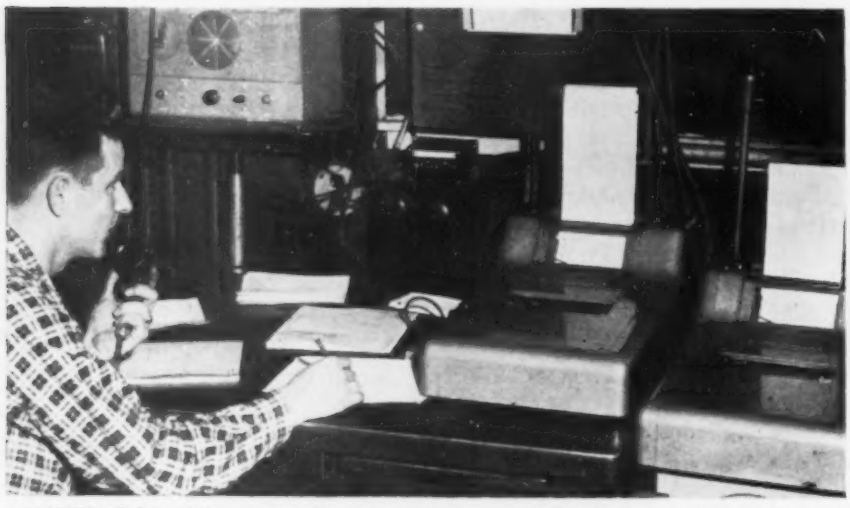


YARDMASTER (inset) assigns engineer's job in 900-acre plus plant.

The operator of such a unit can employ a handset exactly like the conventional telephone. Or he can plug in a set of earphones, carry the microphone in his hand. For the worker whose hands must be free, there is a single earphone of hearing aid dimensions and a throat microphone.

Sets have been used on ore bridges in steel mills, though this use hasn't been developed. More commonly, transceivers are used to control rail and truck traffic in the company switching yard or in plant police cars. They are being used increasingly by doctors, are already in ore mines, on the decks of towed barges as a means of communication with the tug, in dam building to communicate readily with workmen atop the dam, or even to tune the antenna atop a TV station where the outside workman must be in close contact with the station engineers inside.

Range of the transmitters is limited by power output and to



MASTER CONTROL point directs work flow at Inland's No. 3 blooming mill.

some extent by antenna height. A steel mill using transceivers found "dead spots" in the plant area, assumed that the transmitter at the central office couldn't reach all parts of the mill because of the metal shielding some areas. By lifting the base station antenna higher, engineers found a low-powered set could cover the entire mill. They're now considering smaller units to contact overhead crane operators from the mill floor.

Salesmen for these midget broadcasting systems claim they can list, by count, a thousand applications for small transceivers. At present, it's pretty positive that there aren't that many applications in use, though builders of these sets seem eager to test them out.

Encouraged by climbing sales, builders, are pushing their product and at least one new competitor has entered the field. Industrial radio is an infant, but is for the first time really beginning to grow.

WALKIE - TALKIE contacts police, fire, medical personnel rapidly.

VIOLENCE flares in AFL-CIO jurisdictional dispute in Cleveland.

Unions:

Violence flares in forge plant jurisdictional dispute.

A jurisdictional dispute between AF of L Blacksmiths and CIO Autoworkers erupted in violence last week at Cleveland's Park Drop Forge Co. At least 3000 strikers and sympathizers from nearby plants gathered near the East Side plant soon after the AF of L union petitioned for bargaining rights for an estimated 200 workers who returned to work approximately 2 months ago.

Police Isolate Plant

Although no serious injuries were reported, at least 25 demonstrators were arrested as shots were fired and some pickets hurled stones and rolled marbles under police mounts.

Over 150 Cleveland police gained the upper hand by sealing off the plant area behind barricades. Company officials who took films of the demonstration last Wednesday from the third floor roof of the plant went to court seeking to punish union leaders and members for allegedly violating an injunction against mass picketing handed down last November.

CIO Regional Director Pat O'Malley, International Representative Edward H. Schultz and President David Smith of CIO Local 776 were all named as defendants. Mr. O'Malley and the other defendants were scheduled to answer contempt of court motion charges early this week.

According to Regional NLRB Director John A. Hull, Jr., dismissal of an unfair labor practices charge against Park Drop Forge has cleared the way for consideration of the AF of L Blacksmiths' petition to represent workers who crossed picket lines 2 weeks ago. Autoworkers struck last October after walking out on wage negotiation talks. Union officials charged that the company refused to negotiate with the CIO and dealt with Blacksmiths in an effort to smash their union.

Wages:

K-W workers volunteer wage cut to help reduce costs.

Unprecedented, unexpected, but nearly unanimous was the offer of the Kaiser-Willys local of United Autoworkers to take a voluntary 5 to 10 pct wage cut to assist the company in getting competitive on costs with its automotive opposition.

Last week UAW Vice-President Richard T. Gosser offered his plan to change pay from an individual and group incentive plan to a straight hourly rate. Some 3500 workers voiced their immediate agreement at a mass meeting.

"Our long range goal is to achieve a 20 pct reduction in manufacturing labor costs," Mr. Gos-

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The trend toward automation has focused attention on the cost-cutting advantages of complicated, costly gages for inspecting, measuring, sorting and size-control. But such prominence has caused top management of many firms to question.

"If we can't afford complicated gages, isn't there an alternative? Must we continue to be handicapped by the slowness and human error inherent in out-moded micrometers and fixed gages?"

There is an alternative, as many firms now know. They're the ones who have investigated the *complete* line of *modern* Federal gages. They've found that it includes dial-indicating, air, electric and electronic types. They've seen some that cost as much as $00,000.00; others that run as little as $00.00. They've been impressed by low-cost Federal dial-indicating gages that cut inspection time in halves, because operators *see* dimensions and limits instead of *feeling* them. So, they've concluded that Federal, with its broad line, is best qualified to give an unbiased recommendation of the right-priced gage for *any* job.

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ser said, "And with this plan, I think we can do it."

The 10,000 employees at the Toledo plant earn an average of $80 a week. The company is currently producing 350 Kaisers, 409 Willys, and 1112 trucks including 827 jeeps weekly.

Will It Spread?

The two-fold plan includes first the cut in wages, but also a measure involving a bonus plan to permit workers to regain their lost pay under certain conditions. The bonus plan calls for a setting aside of a part of the sales totals which would be divided into three parts. One-third would go to the workers, another third to the company, and the remainder for engineering expenses to improve manufacturing methods.

For the most part, the plan was greeted with silence by officials of competing companies and other labor officials. However, rank and file autoworkers in Detroit were not reluctant to voice disapproval. Obviously, they were worried about contagion.

Less Strike Loss in '53

Fact that there were no prolonged industrywide strikes during 1953 cut strike idleness in half from the preceding year.

Only 28 strikes during 1953 involved more than 10,000 workers, according to revised data from the Bureau of Labor Statistics.

Approximately 2.4 million workers were involved in strikes during the year, well under the postwar average. These were spread among 5091 strikes, counting every stoppage involving six or more employees.

Strikes were more frequent in the construction industry, adding up to 1039, and involved 574,000 workers whose time off the job added up to 8 million mandays out of the total of 28 million for all strikes.

Some 312 scattered strikes were listed for iron, steel and other primary metal industries. These involved 202,000 workers and caused a loss of approximately 1.5 million days of work.

STEEL: British Shun Schuman Ties

Fear production controls in Steel & Coal Community . . . Want to avoid influence of European competitors . . . See supra-nationalism as threat to Commonwealth's trade balance.

Britain won't join up with the European Coal & Steel Community if British steel mill operators can help it. That is made clear in the first official statement ever on relations between the British steel industry and "Schumania." Co-operation on certain specified matters such as tariffs and exports, yes, but full-scale participation? No, Sir, not on your life.

Since negotiations began in Europe back in 1950, there have been individual expressions of opinion by steelmen, but no definite statement of official policy. Now the British Iron & Steel Foundation, on behalf of all British steelmakers, has come out with a definite statement against a link-up with the ECSC countries.

It fears that French, Belgian, Luxembourg, German and other European steel-producing countries would have too big an influence in British steel affairs. Also it points out that there is much more to the Schuman Plan than a common market in coal and steel.

ECSC Is Supra-National

When, in 1950, the project of a European Coal & Steel Community was first proposed, it was not primarily concerned with international relationships pertaining to coal or steel. It had a much larger, political, purpose: Fusion of the signatory states into one community, starting with two selected industries.

When the British Government was invited to take part in the negotiations to establish ECSC, its prior acceptance of two principles was sought. First, pooling of coal and steel resources, and second, institution of a High Authority.

Now an invitation has been made to the British Government by ECSC High Authority to negotiate a form of "association" between Britain and the Community. This brings up the same question as was posed in 1950: What would be the implications for Britain if she were to accept the principles of fusion and supra-nationalism?

Would End Preference

British steel industry feels that fusion would disturb relations with Commonwealth markets. Fusion would mean that the United Kingdom and the Community would be considered as one market. The output of European producers would be sold in the United Kingdom on the same basis as that of British producers.

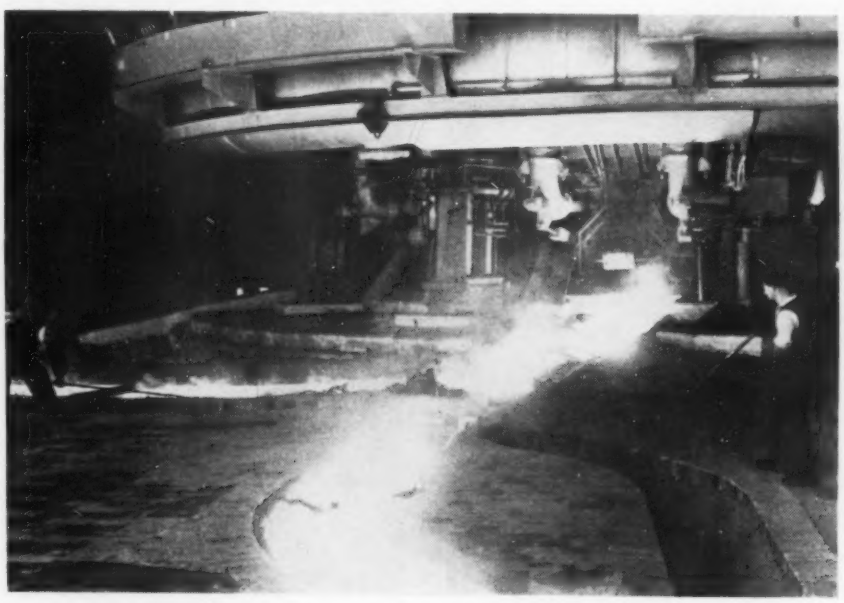
In that case the United Kingdom could no longer accord a preference to Commonwealth steel producers against ECSC producers. This would affect the development of steel industries in Canada and Australia that have recently been heavy exporters to United Kingdom. Also it would no longer be possible for Commonwealth countries to continue according preferential treatment to United Kingdom steel producers as against ECSC producers. Today 60 pct of United Kingdom steel exports go to Commonwealth countries as against 6 pct to the ECSC nations.

Means External Control

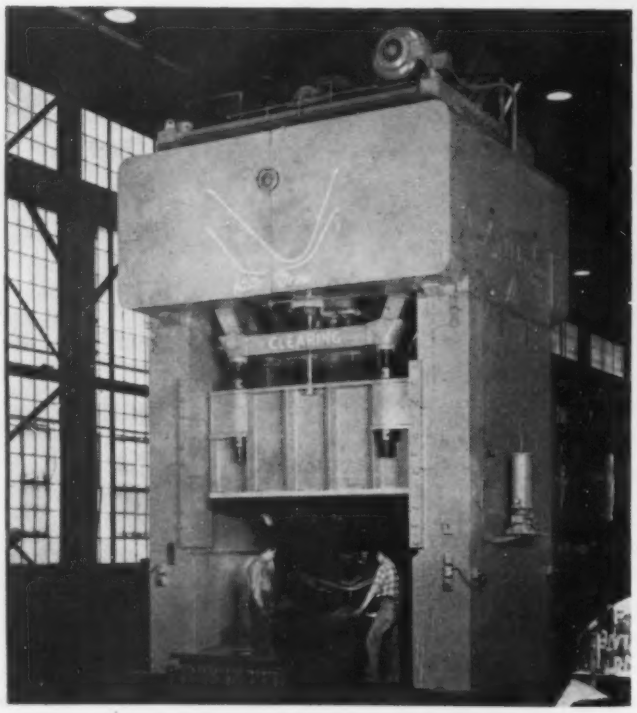
The principle of supra-nationalism would imply that in times of shortage the amount of steel available to Britain as against other consumers would be determined by an authority outside the United Kingdom.

In time of surplus production allowed British steelworks would also be determined by an external authority. This might be pegged below the level considered marketable by the British steel industry.

If the United Kingdom rejects any participation in the common market, it could still treat ECSC as one independent state with another. The fact that Britain's steel output amounts to 45 pct of ECSC's own steel production means that the markets of the one are affected by the policies of the other. This fact alone would seem to make some sort of agreement desirable. There are three topics which might conceivably be covered by such an agreement: — tariffs, exports and investment.



EUROPE'S LARGEST blast furnace, recently blown in at United Steel Co.'s Lincolnshire, England, plant, has a weekly capacity of 6000 long tons.



"KITCHEN" where Chrysler developed recipes for plastic dies. They're in use in making Dodge truck parts.

◀ PLACING STEEL blank on plastic die in 600-ton press.

Plastic Dies Form Truck Body Parts

Sheet steel parts for Dodge truck bodies are being formed in experimental plastic dies that cost 30 pct less than steel dies. And Chrysler Corp. foresees eventual savings as high as 70 pct.

Plastic dies can be made in only 3 to 4 weeks as compared to the usual 3 to 8 months. They're tough enough to take 20,000 psi in a press. A dent from a sharp hammer blow will disappear within minutes, leaving no scratch, according to the auto firm. And if a plastic die is chipped, it can be repaired with a "quickpatch" also developed by Chrysler.

Not yet used in long production runs, quick manufacture of the plastic dies makes them well suited for short runs.

How are they made? Liquid plastic, kept in cold storage, is mixed with a catalyst and poured into a plaster mold previously prepared with strips of glass cloth and a plastic paste. A welded steel baseplate is attached so the die may be fitted into the press.

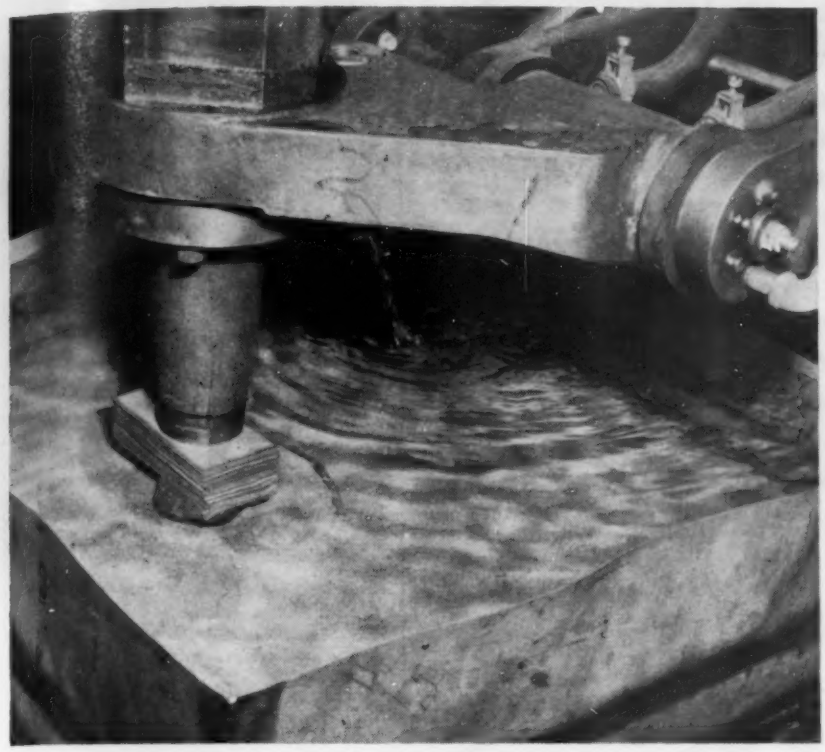
A day's setting at room temperature gets rid of air bubbles, then the unit is baked at 180° F. Chemical reaction raises the internal temperature somewhat higher. After removal from the oven, the plaster is stripped off and the die is hand-polished with sandpaper.

Long-term benefits Chrysler expects include: More frequent style changes in low production models, possible cost reduction in sports cars and luxury models.

PLASTER molds for forming dies. Welded die base is in foreground.

BAKED, die is removed from oven. Can be used as soon as plaster is off.

FINISHING touches are done with sandpaper. Die can take 20,000 psi.



TANK ADDED to standard Sciaky welding machine allows both electrodes, titanium "multidecker sandwich" to meet under liquid coolant—in this case it's plain water.

TITANIUM: Spot Welded in Liquid

Aircraft firm produces small ingots as strong as parent metal . . . Process works on stainless steel . . . Liquid coolant extends thickness range . . . See big cost savings.

Small titanium bars or ingots have been produced by resistance spot welding sheet scrap in a liquid coolant by Martin Aircraft Co. Ingots are as strong as the parent metal and may be machined into aircraft parts. Such use of plant-generated titanium scrap, worth about $1 per lb, would multiply its value many times, giving promise of substantial savings.

Remelting of scrap titanium, known to have been accomplished by at least one of the primary producers, is only a recent development.

Martin found that when both electrodes and the material to be welded meet in liquid, capacity of the welding machines is increased six-fold. Previous experience was that when metal was stacked thicker than 1 in. it would oxidize seriously and become hot enough to cause metal expulsion and warpage.

Welding in a liquid coolant has extended the laminate's possible thickness to 6 in. for titanium, 3 in. for stainless steel — but researchers feel these limits will be only temporary. Work was done with AMS 4901 titanium alloy and AISI 347 stainless steel. Water has proven a successful coolant, though research is not limited to water.

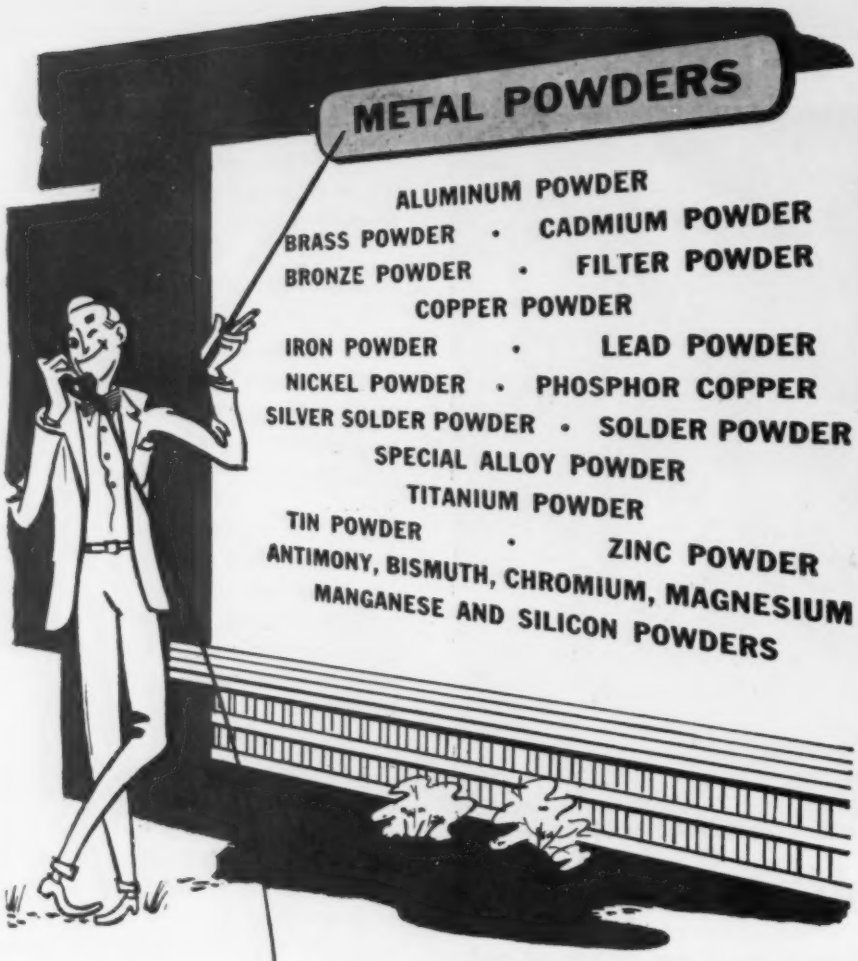
Process itself is relatively simple. In welding 85 sheets of 0.064-in. titanium, with two sheets of 0.092-in. titanium on top and bottom (approximately 5.8 in. overall), the following procedure was used:

Sheets were oxidized in an aqueous solution of 2 pct hydrofluoric acid and 10 pct nitric acid. A 400-kva Sciaky 3-phase welding machine was used with Mallory 3 electrodes 2.5 in. in diameter and with a radius of about 20 in. Cooling tank was 24 x 24 x 8 in. with the bottom electrode protruding from the bottom and the top electrode just submerged in the coolant liquid.

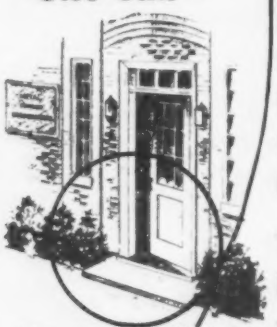
Next step foreseen by Martin engineers is production of long bars by seam welding in a liquid. Beyond that is the possibility of welding different length sheets

Salvaged vs. Primary Titanium

	Parent Material AMS 4901 Ti sheet RC 70000	Welded Test Piece
Tensile Strength	80000 min	92000
Yield Strength	70000 min	73700
Elongation	15 pct min	17 pct



One Call—



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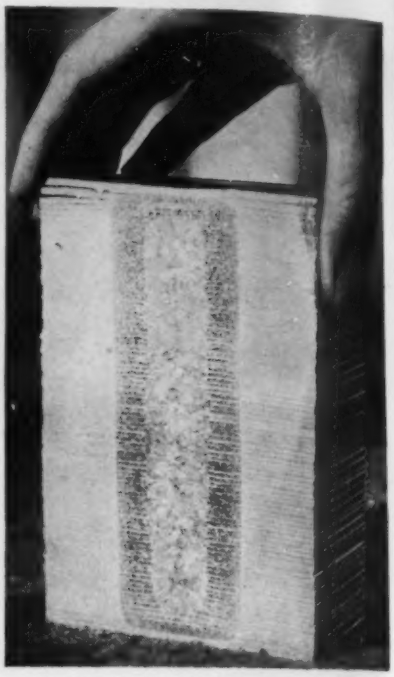


CROSS-SECTION of 89 sheets of titanium after spot welding under liquid.

into step-tapered plate. This would then be machined to exact taper without having to remove so much metal as in current practice.

If this can be achieved, considerable time and money could be saved especially in building prototype aircraft. Procurement delays would be largely eliminated as the raw material would be acquired from the plant's scrap bins.

To Test Small Jet Helicopters

Two small jet-propelled helicopters, possible forerunners of a more flexible transportation system in combat zones, will be put through their paces by the Army soon.

One is the single-place pulse jet XH-26, built by American Helicopter Corp., Manhattan Beach, Cal. It was developed for aerial observation use within territory seized by airborne infantry.

Second is the two-place YH-32, a ram jet product of Hiller Helicopters, Palo Alto, Cal. It is to be delivered to the Army this summer.

Small jets in the rotary wing tips propel the XH-26 and YH-32. Fuel is fed into the jets through lines from the ship's fuselages.

RATES: Rail Cuts Don't Curb Trucks

New reductions make rail freight 5c per 100 lb cheaper than trucks . . . Steel shippers favor highways 55 to 45 pct . . . ICC may peg truck rates—By J. B. Delaney.

Steel consumers show no sign of a significant shift from truck to rail carriers to take advantage of recent rate reductions by eastern railroads (THE IRON AGE, Mar. 11, 1954, p. 81).

It may be too early to judge since the new rates became effective only 4 weeks ago. But even some of the railroads' best friends are frankly pessimistic.

No Shift Yet

The reduced schedules generally are 5¢ per cwt below comparable truck rates. They represent an attempt by the rails to recoup iron and steel tonnage lost to the trucks since World War II. In their petition to Interstate Commerce Commission the railroads pointed out that trucks now haul 55 pct of the combined rail and truck traffic in manufactured iron and steel articles. This represents a gain for the trucks from a ratio of 52.2 to 47.8 in 1950 when the railroads installed a special motor competitive rate for 80,000-lb shipments.

Steel producers say they have noted no great change in the shipping pattern, but the rails may find some encouragement in the admission of one trucker that a spot check among iron and steel haulers indicates a loss of 25 pct in volume due to the rail rate reductions. But part of this could be due to a general decline in shipments felt by both types of carriers.

An accurate appraisal of the situation may not be possible for several months.

Probe May Help

The rails undoubtedly will pick up some business. Most likely to shift are consumers of steel products that require protective wrapping regardless of whether trucks or rails are used. These include tinplate and coated strip products. Cold rolled sheets also require protection in transit but some consumers will take a chance on trucks to avoid extras charged by the mills for wrapping and shrouding. Trucks provide tarpaulin shrouding at no extra cost.

If the latest rate reductions fail to solve the railroads dilemma, their only salvation may lie in outcome of an ICC investigation of rail and truck rates (both common carrier and contract) in the eastern area. This probe, now in its preliminary stages, may require 15 to 18 months to complete. From all indications, it shapes up to be one of the most monumental tasks ever attempted by ICC.

Trucks Preferred

One full day of conferences was required to decide how to start the inquiry. Shippers have been asked by ICC to suggest what data may be necessary to establish cost of rail versus truck shipments.

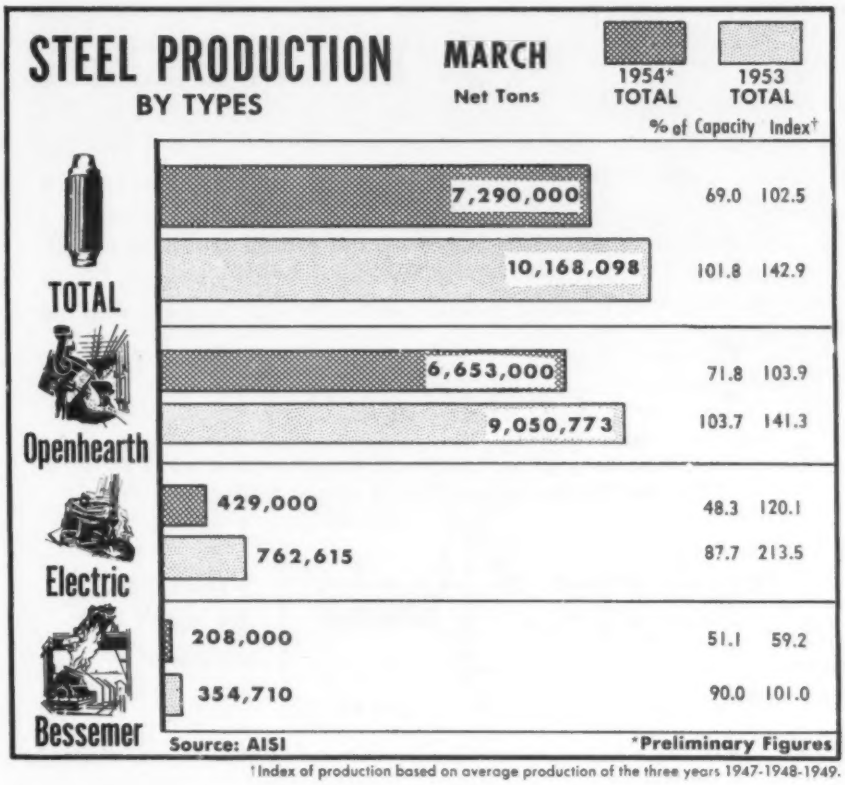
Some observers believe ICC may decide that truck service should be placed in a preferred category subject to higher than rail rates. If this happens and the spread is large enough, some shippers probably would find it advantageous to shift from truck to rail. Truckers believe they would be able to compete even if their rates were pegged at an average of 6 pct above rail schedules.

Ore:

Lakes season opens as carriers discuss seaway progress.

The 1954 Great Lakes ore shipping season got underway this week as Pittsburgh Steamship's 59-vessel fleet weighed anchor and headed north. Despite a relatively late start and a murmuring undercurrent of pessimism most vessel operators were unruffled.

This year operations will be more streamlined. Slashing operating costs will almost certainly result in further reductions of the 276-vessel fleet. Retirement pro-



in portable nibblers

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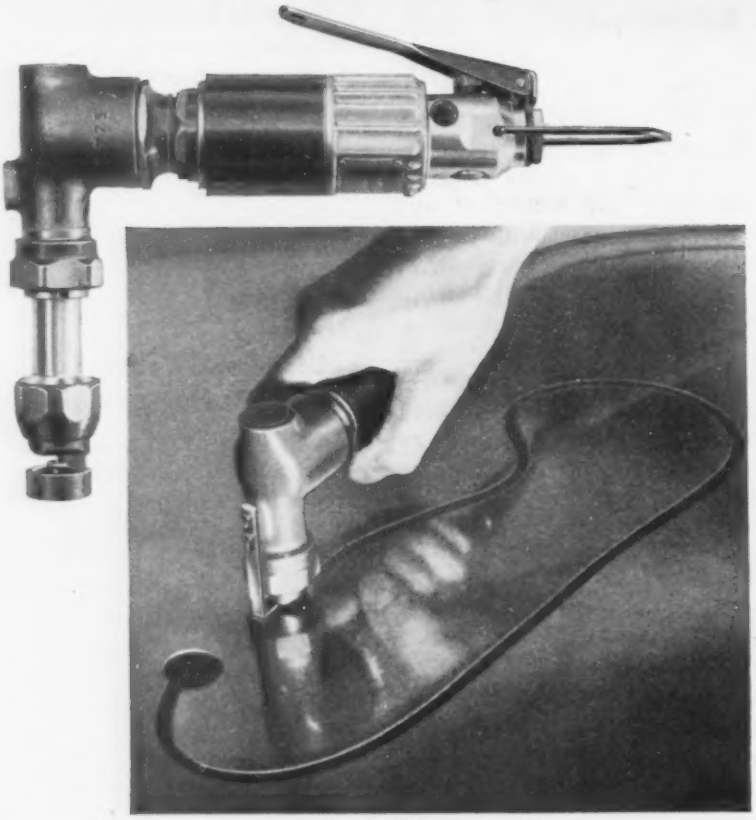

Buckeye portable air-powered nibblers eat their way through 18-gauge sheet metal, leaving a clean, sharp cut with no distortion of the exposed edges. They cut a radius as small as one inch, follow the most intricate contours swiftly and exactly. When working on panels already assembled in position, cutting can be started anywhere an access hole is provided for the nibbler. Extra-long throat model permits cutting in hard-to-reach areas.

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gram has been made possible by recent addition of modern capacity and prospect of a near 70-million-ton shipping season.

Canada Stands Firm

While lower ore goals have prompted some talk of overcapacity, members of the Lake Carriers Assn. forgot to bring crying towels to the association's annual meeting in Cleveland recently. Delegates from both sides of the border were more concerned with the St. Lawrence Seaway, inland water improvements and routine operating problems.

A Canadian delegate representing the Ministry of Transport did a neat job of summing up seaway sentiment when he told THE IRON AGE, "We are going to have it—with or without you." At the moment it seems very likely that the seaway will be a joint effort.

Postpone Lakes Projects

U. S. government officials who attended the carriers parley on the eve of the season's opening spent a great deal of time stressing seaway benefits. Major General S. D. Sturgis predicted seaway would yield $4 in savings to industry and commerce for every $1 of federal appropriation. The Chief of Army Engineers also said recent House Committee reports on public works indicated possibility of saving 50 million tons of traffic and an estimated $60 million through development of balanced 2-way water traffic between Canada and the U. S.

Defense Comes First

Army engineers who attended the meeting stressed the "calculated risk" program which made postponement of many inland waterway improvements necessary. It was explained that defense projects necessarily outnumbered civilian public works by a ratio of 3 to 1. But if cold war pressure eases in the foreseeable future Corps of Engineers hopes to get started on 46 authorized Great Lakes projects which will require $246,905,000 for completion.

BOLTS: Use Increases In Building

Report on new bolt developments touches off hot discussion at AISC meeting . . . Cite easier, cheaper installation . . . Some fabricators disagree—By K. W. Bennett.

When the use of high-strength bolts was discussed at Milwaukee last week at the American Institute of Steel Construction, an offstage skirmish began that seems guaranteed for a long run. Paper that touched off the lively floor discussion was "Recent Developments in the Use of High-Strength Bolts," by W. C. Stewart, technical adviser to the Industrial Fasteners Institute.

Increase Is Recent

Both suppliers and consumers report that an increasing tonnage of high strength bolts is being used to hold structural steel together, and the increase is not entirely due to the strength of current building programs.

Number of suppliers and distributors of high-strength bolts for building construction began climbing a year-and-a-half ago. Tonnages sold began to increase appreciably last year and the last 6 months indicate another strong upward trend in the use of bolts.

Probably the heaviest tonnage sold is in ⅞-in. diam 2 to 4-in. bolts, for use in steel building frames. But their use is creeping into railroad bridges (claim is that remote bridges can be serviced more economically by a bolting crew than a riveting crew), into power transmission towers, and into a few heavy crane applications.

Fabricator Disagrees

Average bolt cost estimates run from 25¢ to 35¢. One example cited by a supplier: A rivet costs 5¢ plus 75¢ for installation; a bolt costs 25¢ plus 25¢ for installation. Rivet's total cost is 80¢ while the bolt's is only 50¢.

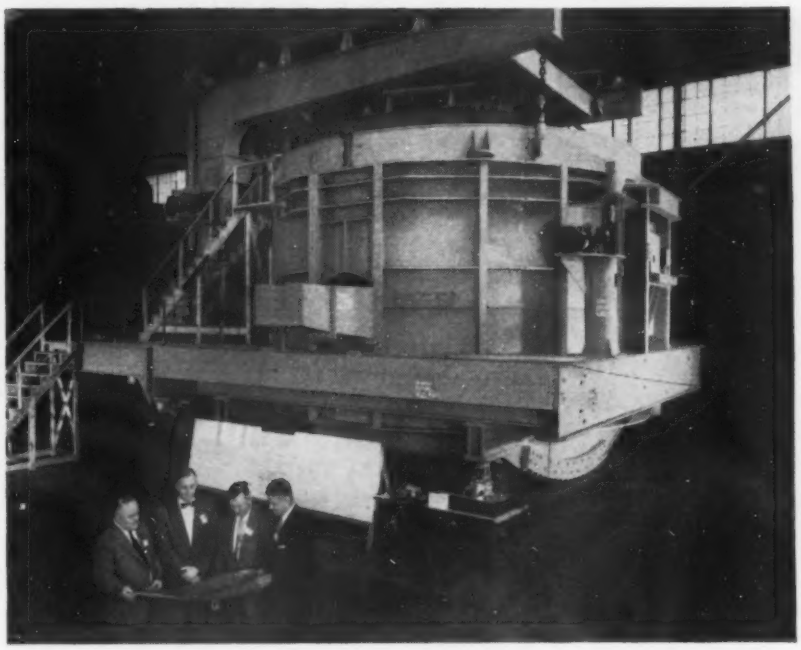
But some fabricators disagree. One figured, on a job in the South, that his installation cost per rivet was only 35¢ plus the initial 5¢ rivet cost.

Among the fabricators who remain unconvinced on comparative costs are those who are increasing bolt usage for other reasons. One of these is that well-trained riveters aren't easy to get.

Riveting generally calls for a four-man team, and each member must know something about his job or he'll be dropping hot scale over everybody working beneath him. Bolting requires a two-man crew, operating a pneumatic bolting wrench that is preset to tighten the bolt to the required tension, requires less skill than riveting.

Speaking from the floor during the discussion period, one attendee of the AISC convention reported his belief that the bolted joint had 50 pct more shear strength than a rivet joint, though there is little

Expansion



Ship First 200-Ton Electric Furnace

The world's largest electric steelmaking furnace—a 200-tonner—is being shipped to McLouth Steel Corp. from the Ambridge plant of U. S. Steel's American Bridge Div.

The Heroult furnace is one of two being made for McLouth as part of expansion plan.

Some statistics include: Inside shell diam. 24 ft 6 in., depth of hearth 3 ft 9 in., height 14 ft 6 in., weight, including heat, 700 tons, outside diam. ring of roof 25 ft 6 in., fore plate line to top of shell 8 ft., transformer cap. 25,000 kva, roof refractory 18 in., bottom refractory 2 ft 7¾ in., sidewall refractory 18 in., inside refractory 3200 cu ft. Furnace will be top charge. Three electrodes will be 24 in. in diam.

Photo was taken at American Bridge plant before dismantling for shipment. In foreground are (l. to r.) Oscar Seidel, plant manager; Austin Paddock, vice-president—operations, American Bridge; James R. Walsh, McLouth engineer, and Norman Obbard, vice-president and general contracting manager for American Bridge.

data available on shear testing of bolted joints in a steel framework. This need should be remedied eventually. Plans for shear testing are being discussed at present though no program has been set.

The bolt, pulling together the opposed faces in a joint, adds the friction of these surfaces against each other, to the inherent strength of the bolt itself.

Bolts are designed to give about 70 pct greater ultimate strength than their preload. Under standards approved this year, a 1-in. diam bolt would be required to have a minimum tension of 42,000 lb. In some instances at least, this has eased building inspection requirements.

In one bolted structure put up in Minnesota recently, the pneumatic wrenches used to tighten the bolts were set for about 15 pct over the required tension. Only inspection required was that the wrenches be checked to see they were delivering the proper pressure.

Ease Building Codes

Calibrating of pneumatic wrenches to get the required tension in the bolt has now been established at 15 pct over the required minimum tension. Thus a 1-in. diam bolt, requiring 42,000 lb pretension, would be installed in a structural joint by a pneumatic wrench delivering 49,000 lb of actual pretension on the bolt. This system could simplify building inspection considerably, as was indicated in the Minnesota building mentioned above.

Codes governing the use of bolts are relaxing somewhat. They can now be used in bolting together painted joints, in some instances. Flat washers can now be used with nearly all wide flange beams.

The high strength bolt is relatively new. It was only 4 years ago that the first generally publicized bolted steel frame for a building was erected. It wasn't until 1951 that a fairly complete set of specifications had been approved. Engineers are curious, but a lot of education is still needed, it would seem, in the practical application of high-strength bolts.

Atoms:

AEC green-lights industrial nuclear power experiments.

Firms in an industrial study group headed by Dow Chemical Co. and Detroit Edison Co. are preparing to open a new stage of nuclear power exploration involving actual experiments and preliminary engineering.

An extensive program of research and development on a breeder reactor and on related equipment and processes will cost the Dow-Detroit Edison group an estimated $2.3 million.

Industry Pays Part

However, as much as $300,000 of this total may be spent for specific research work in specialized plants of the AEC. The agency will permit this work at industry expense if the facilities are not needed for any AEC project with a higher priority.

If the group's investigations involve work of direct interest to AEC, the agency will foot the bill. The cost of work in this category is estimated at about $300,000.

Ready Crack-Down on Ratings

Business & Defense Services Administration is getting ready to crack down on anyone who may be using defense ratings or symbols for illegal or unauthorized purposes.

Administrator Charles F. Honeywell says his enforcement staff is currently investigating several cases, four of which involve illegal procurement of scarce nickel. In one case, the BDSA head says, something more than 40,000 lb is involved.

"It just sounds the same, Senator . . . we've engaged in submersive activities."

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Slip ring housing assy, 1 ea, $104,295, Press Wireless Labs, Inc., West Newton, Mass.

Frequency shift converter, 117 ea, $78,191, H. O. Boheme, Inc., New York.

Synchronizer, electrical, 15 ea, $94,755, Gilfillan Bros., Inc., Los Angeles, Calif.

Regulator assy, 10 ea, $94,755, Gilfillan Bros., Inc., Los Angeles, Calif.

Motor generator, 50 ea, $94,755, Gilfillan Bros., Inc., Los Angeles, Calif.

Pullover gage kits and spare parts and accessories for the following guns: 37 MM, 40 MM, 57 MM, 75 MM, 76 MM, and 3 inch, 90 MM, 105 MM, 120 MM, 155 MM, 8 inch and 240 MM guns, $51,644, Crown Mfg. Company, Philadelphia, Pa.

Water chillers, 16 ea, $57,776, Airtemp Construction Corp., Dayton, Ohio.

Flashlights, tubular type, 18000 ea, $46,620, Stewart R. Browne Mfg. Co., Inc., New York.

Valves, gate, 161 ea, $51,664, Crane Co., Long Island City, N. Y.

Aircraft target, 550 ea, $229,974, Aerolab Development Co., Pasadena, Calif.

Kits, 14 ea, $67,467, The Glenn L. Martin Co., Baltimore, Md.

Spare parts, Call No. E-01K-54-16, 14 ea, $67,467, The Glenn L. Martin Co., Baltimore, Md.

Cell gunsight, 451 ea, $51,052, A. C. Spark Plug Division, Flint, Mich.

Mirror gunsight, 159 ea, $51,052, A. C. Spark Plug Division, Flint, Mich.

Mount assembly, Call No. SR-54-20, 3389 ea, $51,052, A. C. Spark Plug Div., Flint, Mich., *L. R. Steffen.*

Kit assys, spare parts to support item 1, Call No. SR-54-10, 3925 ea, $779,219, Sperry Gyroscope Co., Great Neck, L. I., N. Y., *George A. Dennis.*

Kits, modification to reduce heater temperature, Call No. SR-54-9, 1070 ea, $51,400, A. C. Spark Plug Div., Flint, Mich.

Misc. kit assys, for A-1A computer, spares, Call No. SR-54-6, 372 ea, $293,289, Sperry Gyroscope Co., Great Neck, L. I., N. Y., *George A. Dennis.*

Kits, replacement of potentiometers on A-1A computer & spare parts, Call No. SR-54-16, 964 ea, $51,976, A. C. Spark Plug Div., Flint, Mich.

Kits, replacement of potentiometers on parts, Call No. SR-54-15, 1070 ea, $53,095, A. C. Spark Plug Div., Flint, Mich.

Compressor, air horizontal, stationary IFB 09-603-53-226, 81 ea, $261,387, Worthington Corp., Atlanta, Georgia.

Kits assy, indicator, 181 ea, $147,977, International Business Machines Corp., N. Y.

Computer, 184 ea, $147,977, International Business Machines Corp., N. Y.

Call No. SR-54-12, 200 ea, $147,977, International Business Machines Corp., N. Y.

Kits assy for computer, spares to support #1, Call No. SR-54-15, 174 ea, International Business Machines Corp., N. Y.

Transformers and lighting arrestors, static, three phases, 50 periods, continuous service, in oil-immersed, natural cooling external temperature 45° C., Lot, $107,614, Stockwell Transformer Corp. of Ohio, Akron, Ohio.

Power unit PE-75 s/sub, items, 2316, $900,278, International Fermont Machinery Co., Inc., Ramapo, New York.

Tabular list of parts, 772, $900,278, International Fermont Machinery Co., Inc., Ramapo, New York.

Literature, 20, $900,278, International Fermont Machinery Co., Inc., Ramapo, N. Y.

Wellman will build it

Special Cranes
Ore Bridges
Gas Producer Plants
Charging Machines
Car Dumpers
Gas Flue Systems
Gas Reversing Valves
Coke Pushers
Mine Hoists
Skip Hoists
Clamshell Buckets
Forging Manipulators

Wellman ore bridges

New 577 foot span speeds handling of ore

Wellman 17 net ton ore bridge. Total length 577 feet.

● This new installation, built for one of America's largest steel companies, embodies many engineering features which speed the handling of ore and curtail costs.

Wellman's more than half-century of experience is at *your* service . . . to engineer and build equipment to improve your operations.

THE WELLMAN ENGINEERING COMPANY

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Industrial Briefs

Navy Contract . . . RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, has received a contract from Navy Dept., Bureau of Ships, to build over a hundred motor alternator sets complete with high shock design control panels and magnetic amplifiers for use as electronic power sources for radar, sonar and similar devices on U. S. salvage vessels, net laying ships, tugs and tug auxiliaries.

Distributor . . . BERYLLIUM CORP., Reading, Pa., has appointed Williams & Co., Inc., 901 Pennsylvania Ave., Pittsburgh, as distributor of BERYLCO beryllium copper strip, rod and wire.

Expanding . . . THE RAYMOND CORP., Greene, N. Y., is planning to build a single-story plant with offices, totaling 55,000 sq ft.

Convention Talk . . . Charles F. Becher, divisional spindle development and service engineer for the New Departure Div., GENERAL MOTORS CORP., Bristol, Conn., will address the American Society of Tool Engineers Convention in St. Louis on May 6. His talk will be on "The Application of Precision Ball Bearings to Machine Tool Spindles."

Machine Tools . . . CONTINENTAL FOUNDRY & MACHINE CO. has installed approximately $3 million worth of new machine tools in the machine shops of two of its plants at East Chicago, Ind., and Wheeling, W. Va.

Congratulations . . . LAUREL MACHINE & FOUNDRY CO., Laurel, Miss., is celebrating its fiftieth anniversary this year.

Now Available . . . E. W. BLISS CO., Rolling Mill Div., has acquired the manufacturing rights of the "Weld-a-Matic" splicer from the dissolved Arms-Franklin Corp.

Elected . . . ATLANTIC STEEL CO.'s Warehouse Div. manager, Milton C. Sarran, has been named president of the Southern Chapter of the American Steel Warehouse Assn.

Appointed . . . PARKER APPLIANCE CO., Cleveland, Ohio, has appointed Power Transmission Products, 1107 N.W. 14th Ave., Portland, Ore., as a distributor for its precision tube fittings line.

In Full Swing . . . First production unit of ALUMINUM CO. OF AMERICA's new Chemical Products Plant is now in full operation. The first unit is one of four, each for separate products, that will compromise the Chemical Products Plant when completed.

New Project . . . ARMCO STEEL CORP. will begin construction soon on a new $1.25 million project at its East Works Plant which will help greatly to conserve the water resources of the Miami (Ohio) Valley. The system will save around 10 million gal of water per day.

Will Lease . . . HERCULES POWDER CO. will lease, with an option to buy, the government-owned Missouri Ordnance Works for $3,625,000.

Signed Up . . . A total of 27,452 employees of REPUBLIC STEEL CORP. have placed their signatures on "Freedom Scrolls" for the Crusade for Freedom.

Granted . . . CLARK EQUIPMENT CO. has granted Erie Industrial Trucks, Inc., Erie, Pa., a franchise for the sale and service of Clark industrial fork-lift trucks.

To Be Opened . . . GENERAL ELECTRIC CO., Schenectady, will open its new $25-million plant at Rome, Ga., May 11. The new power transformer plant is said to be one of the most modern in existence.

THE IRON AGE

"All you have to do is say 'No' . . . But don't tell me how to run my business."

HENNY MOTOR CO. head, C. R. Feldmann, has made an offer to buy Reo Motors for $16.5 million.

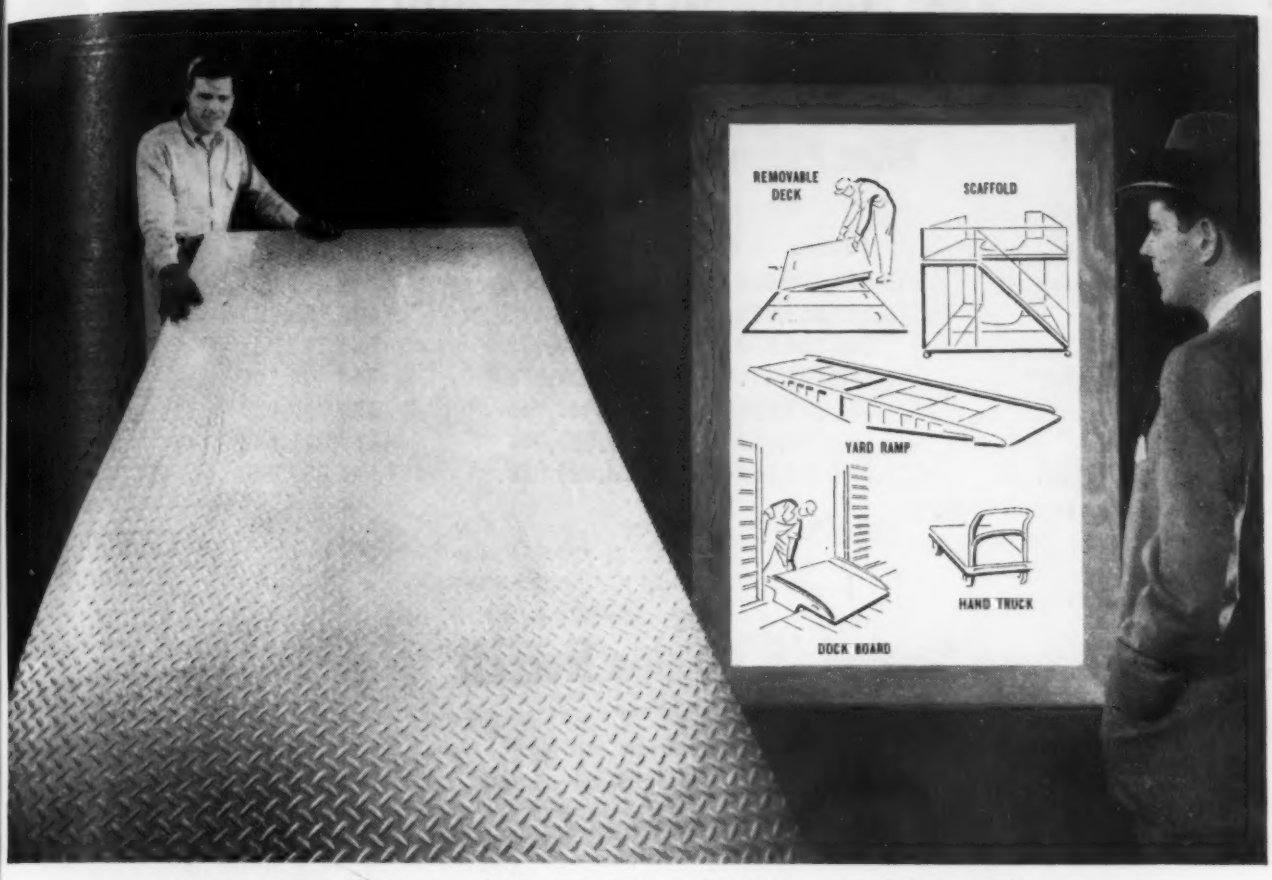
Pennsylvania Plant . . . ROBERTSHAW-FULTON CONTROLS CO. is expanding its production facilities with the opening of a new plant at Indiana, Pa. W. D. Miller will be in charge of the new plant.

Honored . . . MESTA MACHINE CO., Pittsburgh, was honored recently by the Pennsylvania Dept. of Labor & Industry. The Labor Dept.'s "Certificate of Merit" was presented by David M. Walker, department secretary, to Lorenz Iversen, President of Mesta, in recognition of the firm's outstanding safety record in 1953.

Special "Dividend" . . . Two employee-stockholders of WESTINGHOUSE ELECTRIC CORP. each received a special "dividend" recently, an expenses-paid round-trip to California. Blaine Burkholder and Milton H. Downs won the trip for themselves and their wives by submitting the prize-winning essays on "What Owning Stock in Our Company Means to Me."

Dividend . . . FOOTE BROS. GEAR & MACHINE CORP., Chicago, has declared a quarterly dividend of 32½¢ a share on the $2 par value common stock, and the regular quarterly dividend of 21.56¢ a share on the $15 par 5.75 pct convertible cumulative preferred stock.

DOW



Take a new look at magnesium . . . *wherever equipment must be lifted or moved. Today, more than ever before, magnesium can help you design for greater savings in weight, greater economy in fabricating costs.*

LIGHTWEIGHT MAGNESIUM TREAD PLATE

NOW AVAILABLE IN LARGER SIZES AND GAUGES AT NEW LOW PRICES

Now, for the first time in the metals industry, you can get big, new sizes of lightweight Dow magnesium tread plate *at prices lower than ever before.*

For example, Dow magnesium tread plate made to the famous "Inland" 4-way design is available in lengths up to 16 feet . . . in widths up to 6 feet . . . in thicknesses up to 2 inches. This is important news for every designer.

These larger sizes mean faster, more economical fabrication *plus* new design opportunities in the field of materials handling. Look to magnesium wherever weight and motion are important use factors—it will cut employee fatigue, increase operating efficiency.

There is a place for tread plate made of magnesium, *the world's lightest structural metal*, almost everywhere, in every plant, every industry.

For further information about Dow magnesium tread plate, fill in the coupon below and mail it today. THE DOW CHEMICAL COMPANY, Midland, Michigan.

Send for new booklet about DOW MAGNESIUM TREAD PLATE

Contains new design opportunities using this *lightest* of all structural metals.

THE DOW CHEMICAL COMPANY, Dept. MA 321B-1, Midland, Michigan

Name_____

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City_____ State_____

you can depend on DOW MAGNESIUM DOW

What Automakers Sold, Earned in 1953

Company	1953 Sales	1953 Earnings	1952 Sales	1952 Earnings
General Motors	$10,028,000,000	$598,000,000	$ 7,549,000,000	$559,000,000
Chrysler	3,347,863,995	74,788,617	2,600,958,683	78,696,599
Studebaker	595,080,870	2,687,973	586,117,763	14,291,789
Nash-Kelvinator*	478,697,891	14,123,026	358,400,502	12,603,701
Packard	335,819,090	5,440,966	233,737,020	5,618,263
Hudson	192,846,083	—10,411,060	214,873,982	8,307,847
TOTAL	$14,978,307,929	$684,629,522	$11,543,087,950	$678,518,199

*Fiscal year ended Sept. 30

Summer Slump Soured '53 Sales Record

After full-steam start, auto sales fell off in mid-year . . . Some firms still feel effects . . . Independents lose ground . . . Income dips to 4.5 pct of sales—*By R. D. Raddant.*

A serious sales slump that started in mid-season 1953 tarnished the financial reports of the auto industry for the past year. After a start that indicated it would be one of the best financial years in history, 1953 ended on a gloomy note that still prevails in some segments of the industry.

An IRON AGE study of the auto industry's sales and earnings shows the same rule that could be applied to almost every business: Sales up but earnings lagging.

Tough on Independents . . . It also shows a serious and perhaps widening gap between the Big Three and the Independents, at least two of which lost money and a third, considered one of the strongest, barely making headway.

The tabulation excludes Ford Motor Co., which does not publish a financial statement, and Kaiser-Willys, late in completing its report. Ford, which enjoyed one of its best years, would be placed above Chrysler in both sales and earnings, but how much is strictly a guess.

Among the struggling group of "break even" independents, Kaiser-Willys has a complex situation compounded by the purchase of Willys by Kaiser and the sale of Willow Run to General Motors. Kaiser has operated at a loss every year and it is doubtful if the Willow Run sale and the Willys operations resulted in a black report for 1953.

The entire industry is overshadowed by General Motors' $10 billion plus sales, most ever made by a private company, and earnings of over $598 million. This compares with U. S. Steel Corp. revenue of $3,861,034,728 and earnings of more than $222 million, showing the magnitude of the automotive leader compared with the largest steel producer.

Sales, Earnings Up . . . Net income of the auto industry was approximately 4.5 pct of sales compared with 5.8 pct in 1952. Total sales were $14,978,307,929 with earnings of $684,629,522 in 1953 compared with sales of $11,543,087,950 and earnings of $678,518,199 in 1952.

Only change in relative position in earnings was the passing of Studebaker by Nash-Kelvinator and Packard. However, the Nash-Kelvinator report is for the fiscal year ended Sept. 30, about the time the industry began to feel the pinch. Nash's yield for the final 3 months of the year would have changed this comparative picture.

What Happened . . . Best summary of 1953, particularly as applied to the independents, was made by James J. Nance, Packard's president. He reported:

"The year 1953 was one of contrast and fluctuating demand, with a resulting heavy impact on operations. During the first 6 months of the year, demand for automobiles was such that it was necessary to run our factory on an overtime basis, pay premium prices for steel and other materials, and hire and train additional inexperienced labor force. In spite of these heavy expenditures to maintain high level production, we were unable, during the first part of the year, to keep up with our dealers' demands for cars.

"After mid-year, with the whole automobile industry geared to heavy production, supply exceeded demand and it was necessary to drastically curtail production in

order to avoid unbalanced inventories."

Hard Luck Story . . . Studebaker was the hard luck guy of the industry. With a completely new model, the South Bend independent ran into die troubles, then a strike by a major supplier. By the time these troubles were over, the sales decline had started.

Hudson, showing a $10-million deficit, had sales problems. However, the big jolt to the financial report was an adjustment of amortization charges of tooling for the Hudson Jet, which had to be written off before the subsequent agreement to merge with Nash.

Automotive Production
(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Apr. 17, 1954..	127,111*	22,991*
Apr. 10, 1954..	128,058	24,016
Apr. 18, 1953..	132,325	29,746
Apr. 11, 1953..	144,352	32,430

*Estimated. Source: *Ward's Reports*

With the Hudson-Nash merger likely, the list of auto companies next year will be reduced for the second straight year. These two companies are destined to be combined in 1954 as the American Motor Co. if stockholder suits can be adjusted.

Market Gets Tough . . . Chrysler's battle to hold position in the Big Three best illustrates the competitive nature of the market as 1954 started. Although it had its best unit sales in history, profits were down almost $4 million from 1952.

The pattern of 1953 will probably be followed in 1954, although with modifications. The end of the excess profits tax will help, and lower manufacturing costs are inevitable. Against these favorable aspects is the increasing stiffness of the market. While unit auto sales are holding up well, they appear to be increasingly concentrated in GM and Ford with even Chrysler slipping. Any independent showing a gain will be fortunate indeed.

Research:

Process development section bridges design—output gap.

GM's fabulous new Technical Center is also one of the newest in the corporation.

In less than 8 years since its establishment in 1946, the Process Development Section has more than proved its worth contributing to product improvement and lower manufacturing costs. When it moves into new facilities at the Tech Center, its projects will be expanded and staff increased in a general plan of expansion.

This section was created and established when GM executives concluded that there would be tremendous advantages in a centralized group to supplement work of individual divisions in improving manufacturing processes.

Result was the formation of this technical group to specialize in manufacturing processes. The concept of the central group was derived from these considerations:

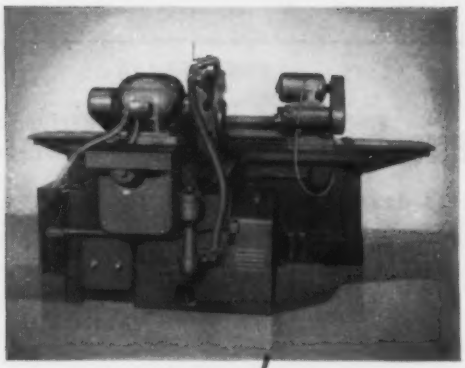
Everyday pressures interfere with long range development; many plants do not have adequate experimental facilities; some problems require group knowledge of specialists; accumulated experience can be available for all divisions; and a central group can bridge the gap between the Research Laboratories, Engineering Staff, and the production organization.

Functions of the section range from special machines such as a gyro-finishing machine for zinc die cast ornaments to development of assembly machines.

The section works in 10 different fields of operation. They include: development of basic manufacturing process, development of special equipment, assembly, manufacturing process, inspection, foundry, development and operation of pilot lines, evaluation of new processes for specific purposes, production adaptation of a new process, and the GM material utilization program.

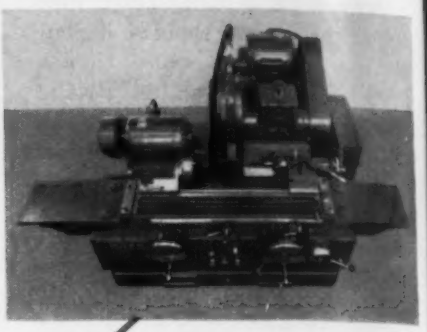
THE BULL OF THE WOODS — By J. R. Williams

HOW THE MIGHTY HAS FALLEN! TH' MIGHTY CRANE IS ON TH' BUM AN' THEY HAVE TO HAUL UP TOOLS BY HAND WITH A LITTLE ROPE!
THAT'S NOTHIN'! WHEN ROCKETS GET FLYIN' TO MARS THEY'LL HAVE TO FIND A BETTER WAY THAN THAT TO COME BACK AFTER FORGOTTEN TOOLS!
4-23
J.R WILLIAMS
THE BIG STIFF
Copr. 1954 by NEA Service, Inc. T. M. Reg. U. S. Pat. Off.



CINCINNATI

FILMATIC

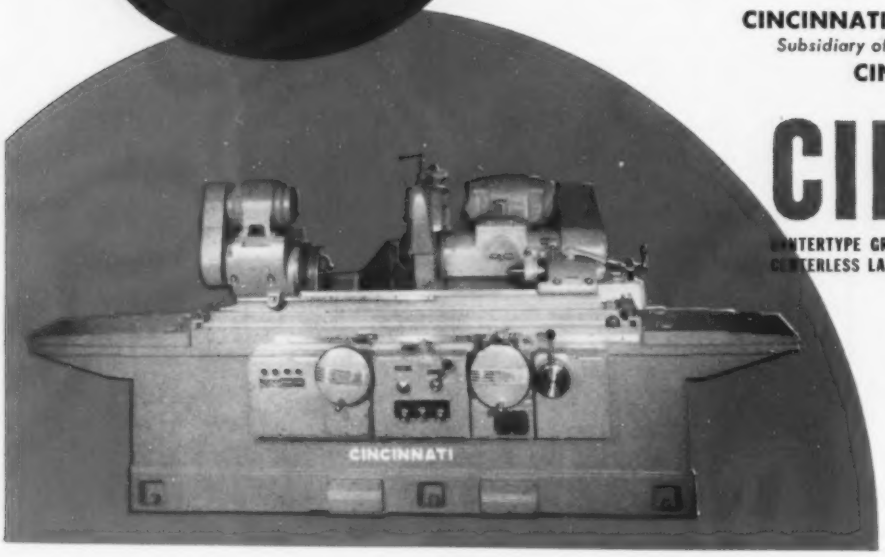


Any Way You Look at it

A look at the "balance sheet" for recent installations quickly shows why management men prefer CINCINNATI for Plain Grinder equipment. Briefly, these machines make money for their owners. How? Well, in the first place consider their reliability. Shopmen will confirm the statement that the grinding wheel spindle bearings are a big influence in the reliability of a precision grinder. In CINCINNATIS, they're FILMATICS; they run for years without quitting. And the overall maintenance picture for these machines is very bright. A number of features such as automatic filtered lubrication of ways, unit construction, and others reduce maintenance to a negligible percentage of cost. These machines withstand severe operating conditions, too. You can count on rapid stock removal to extra fine finishes and accurate sizing. Extra features are available for infeed grinding and high production runs. ¶ We should like to tell you more about these fine precision grinding machines. Look in Sweet's Machine Tool Catalog or write for literature.

Management Prefers

CINCINNATI FILMATIC PLAIN HYDRAULIC GRINDERS



CINCINNATI GRINDERS INCORPORATED
Subsidiary of The Cincinnati Milling Machine Co.
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CINCINNATI

INTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Complete specifications may be obtained by writing for catalog No. G-566-2 covering the 6" and 10"-L sizes; or catalog No. G-603 which covers the 10" (illustrated at the left) and 14"-L sizes.

Army Cold-Shoulders Steel Stockpiling

Planners say it's not necessary, not practicable, appropriations not likely . . . But some officials disagree . . . Case for plates is strongest—By G. H. Baker.

Government mobilization bosses turn a cold shoulder to the idea of stockpiling steel.

Federal purchase and storage of steel products, say Army planners, is (1) militarily not necessary, (2) not practicable, due to changing specifications, and (3) likely to remain an academic question anyway since Congress is not inclined to vote money for this kind of stockpiling.

The Army's dim view on steel storage is not universally shared in Washington, however. Some top-echelon planners on Defense Secretary Wilson's staff are for it. So are some ODM officials. This group looks at the stockpiling proposal this way:

Always Need Plate . . . Certain steel products, like heavy plate, are always needed in time of war or all-out mobilization in large volume and at those times, they're always in short supply. At present, there is excess plate-making capacity. Why not buy and store items like heavy plate now?

Prices are reasonable, storage or warehousing would not be a problem. (Oil coating would be sufficient protection to store in the open), and steel mill employment could be kept up. And plate can always be rerolled, it is pointed out, if a new war produces new demands for other shapes. There would be little or no financial loss, as the Army could always sell its stocks at or near the market price at any time.

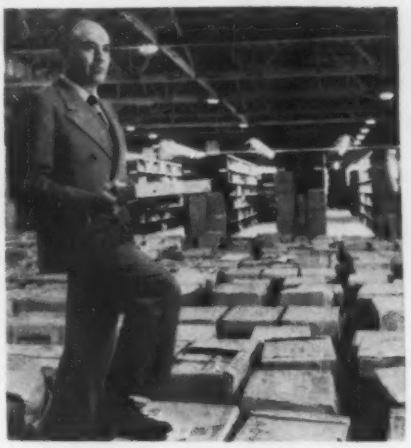
Less Chance on Bars . . . In addition to plate, some thought is being given to stockpiling of bar stock of 1225 analysis, 4-in. rounds and 4-in. squares. The case for stockpiling in this latter case is not as strong. Belief is that these specs are much more likely to change in the future. A much better case can be made for stockpiling plate. However, unless the Army and ODM change their minds on the subject, any actual stockpiling of steel products is a long way off.

Tie GAW to Taxes? . . . A proposal to make guaranteed-wage plans a little more palatable to industry is attracting attention in the House of Representatives.

The plan, sponsored by Rep. Charles J. Kersten, R., Wis., would permit employers who sign guaranteed-wage pacts to deduct from their income taxes 10 pct of the amount required to be paid to employees. Total tax saving could not exceed 10 pct.

Mr. Kersten further proposes that employers, in order to qualify for this tax-saving arrangement, would have to guarantee each employee that he will receive at least 70 pct of his regular pay within any 1 year.

"New here, eh?"



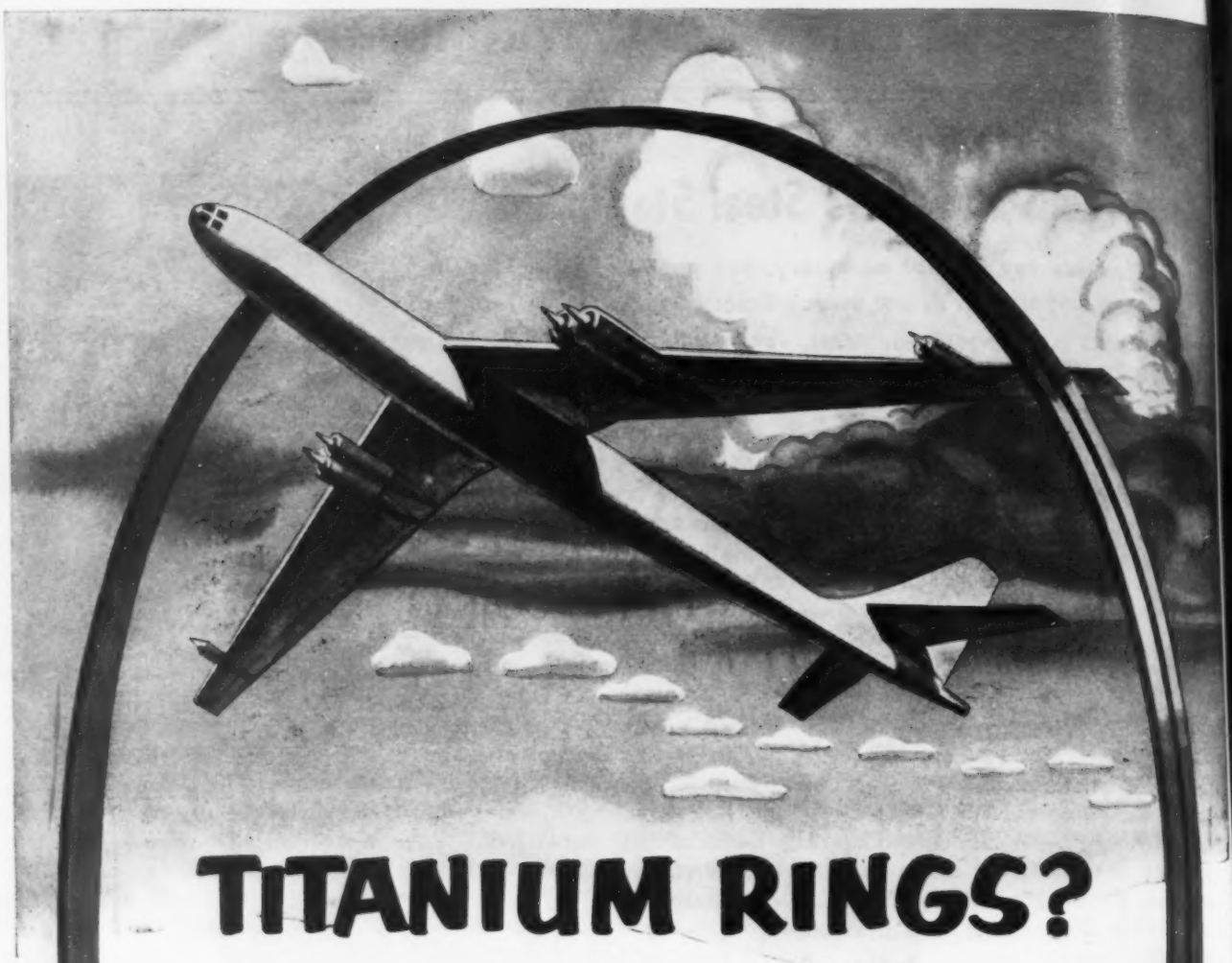
SUPPLIES are the prime concern of Edmund F. Mansure, GSA chief.

House Labor Committee hasn't endorsed the Kersten plan yet, nor has it turned it down. It wants to look over all the angles. But a number of members are attracted by the "employment stability" features of the guaranteed-wage plans. An election year, they reason, is a good time to vote for almost any plausible "security" or "stability" proposal.

Count Tools Again . . . Mobilization planners decline to spend the first nickel of their $250 million kitty for machine tools until they find out what they've got on hand. They've been trying to find out for more than a year. At the rate they're going, another year may pass before a satisfactory inventory is in hand.

Office of Defense Mobilization is charged with maintaining a central inventory of government-owned machine tools. This responsibility is in line with its overall assignment of keeping the President, the Congress, and the public advised as to how the nation's mobilization plans shape up from time to time.

Defense Dept. machinery buyers take the position that they'd be spending the taxpayers' money recklessly if they began placing orders for tools without regard to equipment already on hand.



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Nickel:

Government wants industry help on conservation.

Government planners are turning a strong light on the question of nickel consumption in any future mobilization period—and what they see is not reassuring.

A national emergency obviously would create demand for more nickel than has ever been used before. It's also clear that under these conditions some civilian uses would have to be curtailed.

Still Not Enough

Nickel demand even now is forcing the government to sponsor development of low-grade deposits at high costs. Industry is carrying out its own plans for increasing capacity to produce primary nickel.

Even with these strenuous efforts to obtain more nickel, it is known officially that expansion over the next 4 years will not suffice to meet the government forecast of full mobilization needs. The undisclosed amounts in the national stockpile will help, but whether the stocks will last through the extent of an emergency is debatable.

Ask More Research

Answer then, in the government view, is to encourage industry cooperation in finding and testing measures that will conserve nickel when and if the nation goes to war again. These are considered emergency techniques, for some of them involve too much time and expense to be practical at present.

Advanced development and trial runs of these methods could begin at any time—the sooner the better, as far as the government is concerned. If, for example, an aircraft engine manufacturer has a plan for substituting other metals for nickel alloy steel in his product, Washington would like to have the plan tested.

To make conservation more effective, the government knows it must at least meet industry halfway. Any goals that need to be set for saving nickel admittedly should be set before military items involving nickel reach the mass production stage. Otherwise, they cannot be met.

Production Pools:

Unfavorable report may bring end to defense pools.

President Eisenhower and Congress have in hand a new 18-page Justice Dept. report which may bring an abrupt end to the small business production pool program.

Signed by Attorney General Herbert Brownell, Jr., the report reveals the negligible success attained by groups of small producers and suppliers in their efforts to get military contracts. It was prepared after consultations between personnel of Justice Dept. and Small Business Administration, and no dissent is expected from the latter agency.

Exclusive of three approved last month, the number of production pools authorized to seek larger, more complex defense orders than could be handled by a single small company acting alone is 26. These obtained legal status from the amended Defense Production Act of 1950 which, within set limits, excludes the groups from restrictions of the antitrust laws.

NEW BUDGET DIRECTOR, Rowland R. Hughes last week succeeded Joseph M. Dodge. Mr. Hughes, a New York banker, had previously been deputy director.

By the end of last July, the pools had signed prime contracts valued at $5.4 million. However, this amount included a $2.7 million order that has since been closed out because of default by the production pool.

No defense orders at all were reported by 16 of the 26 groups.

Mr. Brownell suggests several reasons why the pool program may be called a failure. He notes "procrastination and delay" in some pool activites; expectation of preferred treatment by the government, in certain instances; skepticism shown by procurement officials regarding competency of pools; and the allegation that pools may be financially irresponsible.

Press Delaware River Dredging

Maintenance of the Delaware River channel south of Philadelphia has been so inadequate that more than $8 million should be spent in the coming fiscal year to restore the waterway to its authorized, 40-ft depth.

That is the position taken by the six U. S. senators representing Pennsylvania, Delaware, and New Jersey. Earlier this month, they wrote to Chairman Styles Bridges, R., N. H., of the Senate Appropriations Committee, urging that the $1.9 million budgeted for channel clearance and maintenance in the Delaware next year be boosted to about $8.4 million.

The lawmakers' letter maintains that the channel from the sea to Philadelphia has been "neglected until it is today in a very dangerous condition."

Bureau of the Budget is prepared to go along with the spending of an additional $7.3 million over the next two fiscal years to restore the channel to contract depth by July 1, 1956.

Spreading the work over a two-year period would not be satisfactory to the senators who wrote to Sen. Bridges. They argue that the full $8.4 million they requested should be spent in a single year to remove the danger that now exists to shipping in the channel.

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The combination of new synthetic fibers in the strength member of R/M Super-Power V-Belts assures greater resistance to shock loads, virtually no stretch, and practically eliminates matching problems. This, along with our straight side-walls, means better tensioning and grip, less slippage . . . more power delivered on the drive. Compared with regular V-belts you can handle approximately 40% greater load with the *same number* of R/M Super Power V-Belts or do an equal job with *fewer*.

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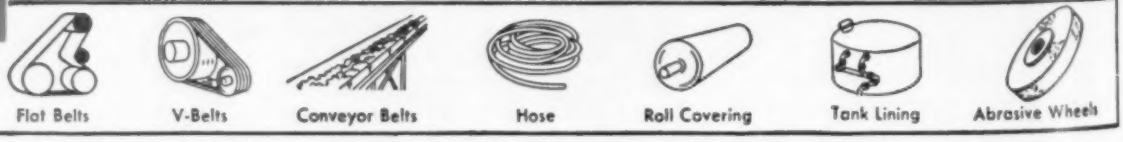

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Inventory Cutbacks Boomeranging

Increased demand from petroleum industry catches suppliers short on stocks . . . Some manufacturers now working overtime . . . Construction active—*By T. M. Rohan.*

The never-say-die petroleum industry was kicking up its heels in the West last week causing some manufacturers to learn new inventory lessons.

A major western supplier who 2 weeks ago received about a $5 million order for ten heavy-duty drilling rigs for Mexico told THE IRON AGE:

"Our inventory cutback is now boomeranging. Like others in the industry we have been reducing for operations at a lower level. Now our unfilled orders have doubled in 2 weeks. We have to go on a 6-day work week with overtime to make our deliveries."

Pump Maker Agrees . . . A top-ranking petroleum pump manufacturer had a similar story.

"We started a second shift this week to take care of the inflow of orders. We had been gradually cutting back our stocks of pumping equipment, drill hooks, rigs, and other items. Our sales the first 2 weeks of April are 14 pct over the same period last month with heavy shipments to the mid-continent area and export fields.

"Where we had looked for a routine replacement business we find drillers now going into heavier equipment which we haven't had in stock. We now are buying for stock rather than on order so we can compete more effectively."

Ahead of '53 . . . Although new ordering was not of boom proportions and was confined largely to the mid-continent area, a third oil country goods supplier said inquiries were about 15-20 pct above the same period last year. Actual sales were up 5-10 pct.

A representative of this firm attributed the rise to two factors:

(1) Operators trying to make up time lost earlier this year on production goals due to "holding off."

(2) Petroleum industry is putting in new equipment rather than continuing to cannibalize and overstrain older equipment. Newer rigs are in the deep servicing category for pulling up casing from 14,000 ft which requires 1500-1800-hp motors and accessories. Previously the general range was 500-1000 hp.

Building Continues . . . Volume of new building indicated by permits taken out in the first quarter in ten Pacific Northwest cities shows continued improvement over a year ago. Major gain has been in residential construction but all building has picked up.

Total for the ten cities for 1954 as of last week was $17.6 million compared with $15.9 million in the same period last year. San Francisco area development is 34 plant projects ahead of last year with 200 more jobs created. Capital investment, however, has slipped.

"Ultra does it again, Chief! This electronic eye automatically honks the horn when the lights change."

Total California manufacturing employment of 1,018,400 in March was unchanged from February for the first time in 5 years. Although down 14,500 from March, 1953, it was second highest March total since World War II. Aircraft enployment remained well over 1953 levels.

Birthday Business . . . Kaiser Co. celebrates its 40th anniversary this week with two new deals under its belt.

The steel firm will act as sales agent for the Pioche Manganese Co., ferro-manganese and silico-manganese producers at Henderson, Nev. And Kaiser Engineers participated in a $60 million contract for construction of a 14-mile water tunnel in Southeast Australia.

A Kaiser birthday statement this week pointed out the organization directly employs 68,000 with $271 million annual payroll; operates in 15 states and territories and 13 foreign countries; has plant area equivalent to Manhattan Island; annual purchases of $543 million and turns out 290 different products from steel, aluminum and cement.

Total assets are $925 million. Annual sales are over $1 billion, making it one of the 30 largest U. S. firms in terms of sales. Total funds employed in business are $820 million, 97 pct being private capital.

No Wage Push . . . San Francisco area autoworkers had an encouraging note for the boss last week. The Automotive Trades Council, representing 10,000 workers in five unions, announced it will continue to work another year under present wages and working conditions "due to the economic and political situation."

Segments represented were auto machinists, garage workers, warehousemen, auto salesmen and also painters.

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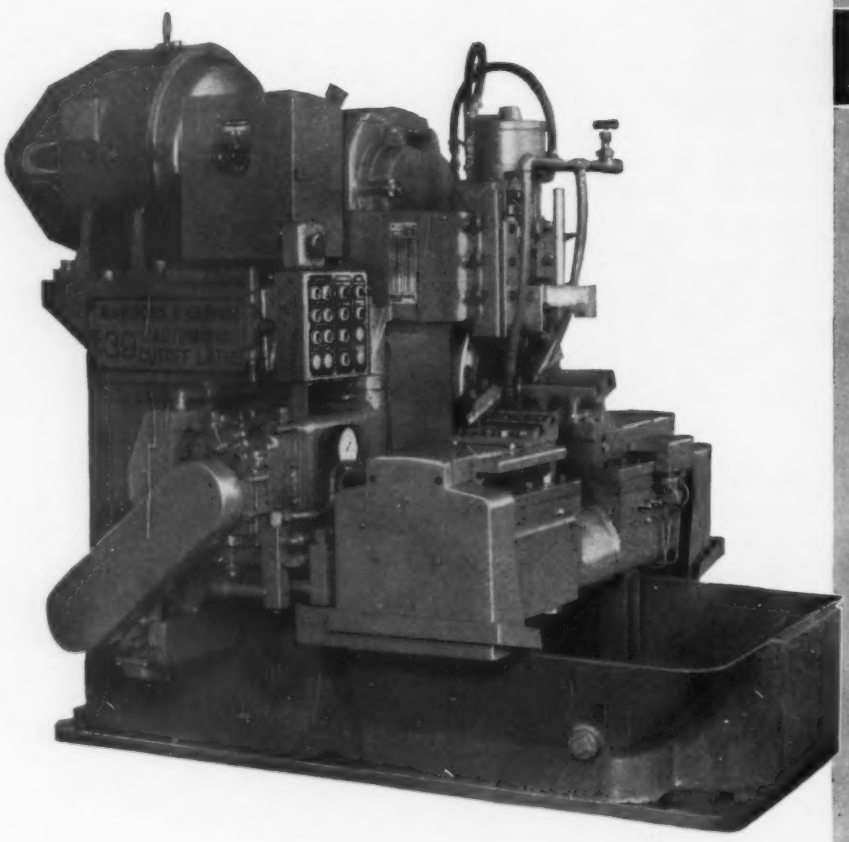

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No. 35 —	″ ″	1″ dia.	to 5-⅝″ dia.
No. 36 —	″ ″	1½″ dia.	to 6⅝″ dia.
No. 38 —	″ ″	2⅜″ dia.	to 8⅝″ dia.
No. 39 —	″ ″	2⅜″ dia.	to 9⅝″ dia.
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Don't Forget General Purpose Tools

F. S. Blackall, Jr., Taft-Peirce president, stresses market opportunities for simple, general purpose tools . . . Not all firms large mass producers—By *E. J. Egan, Jr.*

With all the talk about automation, what's happening to general purpose machine tools? For one thing, they don't seem to be selling so well right now. Some builders report practically no backlogs for these units, and a trip to their plants will show stock models stored in rows, ready for immediate shipment.

Last fall, F. S. Blackall, Jr., president of the Taft-Peirce Mfg. Co., Woonsocket, R. I., expressed some opinions on automation and the future of general purpose machine tools. His address to the Cincinnati Section of ASME was widely quoted, stirred up some controversy.

Off The Deep End? . . . At that time Mr. Blackall observed that machine tool builders had perhaps gone off the deep end in meeting the demands of the mass production industries. In emphasizing massiveness, complex controls and a high degree of automation, builders have featured a lot of extras not needed nor desired by the general purpose user, he said.

From this premise the speaker concluded that a tremendous field is open to the builder who will simplify general purpose machine tool design. Object would be to get prices down but keep quality up to encourage replacement of overage equipment now in use.

Most Firms Small . . . Since today's models of so-called standard tools are not selling as fast as builders would like, THE IRON AGE contacted Mr. Blackall for his latest views on the subject. Here, in substance, is his reply:

"American industry is not composed exclusively of mass-producers like General Motors, Ford and the great electrical manufacturers. Although important, they provide something less than one-half of manufacturing employment, purchase only a proportionate share of machine tools.

"The balance of industry is quite as important, perhaps even more so in the aggregate, although its output is chiefly small and medium lot production. Here the reasonably priced machine tool, readily adapted and quickly set up for a variety of jobs, is a vital need. Even in mass industries many operations can be done just as rapidly on a simple design of general purpose tool as they can on a more complex model. Some of the complex features are never needed, but must be paid for.

Keep It Simple . . . "There is definitely an important place for the ultimate in special machine tools and features, and an equally important one for efficient, accurate general purpose equipment of simplified, advanced design. Provision should be made for precision high speed machining and modest application of special features. But modern production methods, fabrication for better strength-weight ratios, and use of quickly interchangeable parts will minimize costs.

"Some builders may think this implies second-rate equipment, or that this would be a step backward from the rush toward automation. Such thinking ignores the fact that tomorrow's general purpose machine tool will differ from today's as tungsten carbide differs from carbon steel.

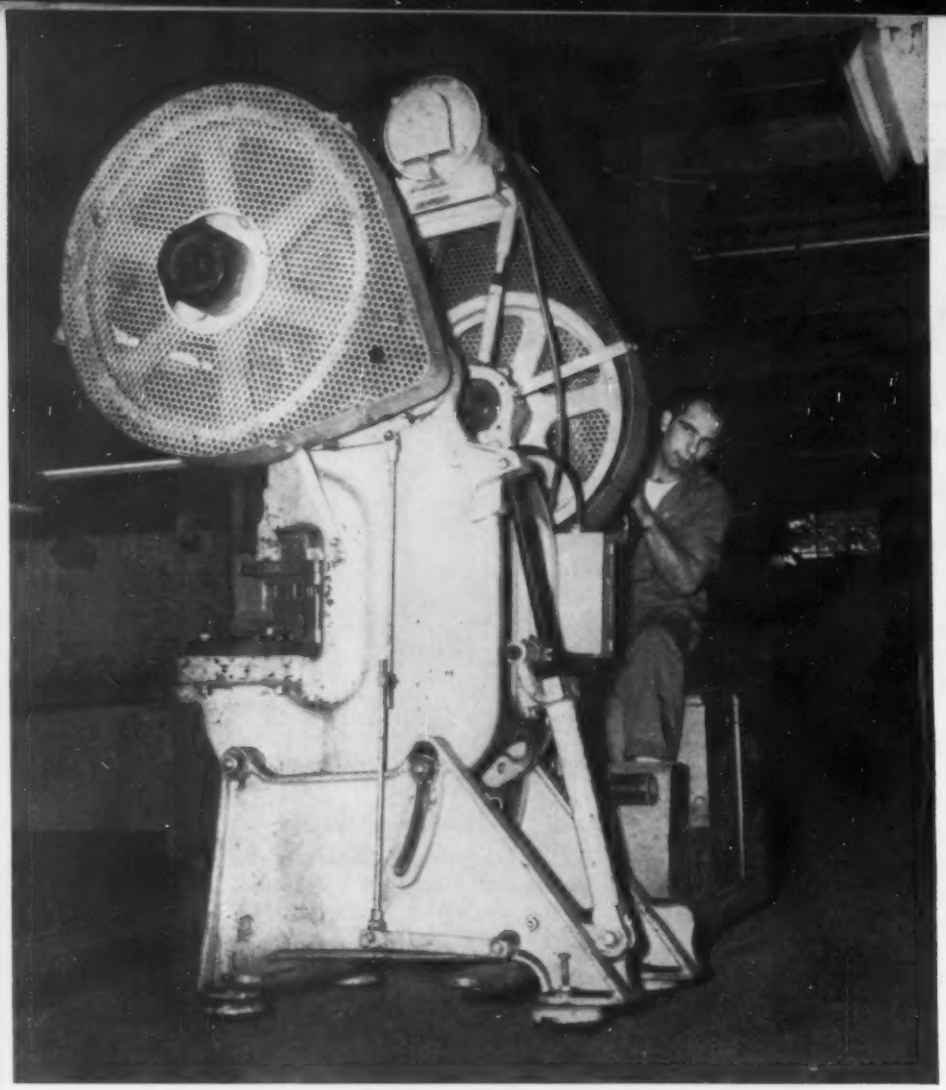
Sales Impressive . . . "Other critics say they've tried to simplify machines, but when every other buyer demanded all the special features they dropped the attempt. Had they stuck to their convictions and offered the prospect *two* types of machine, the needs of both markets could have been met. There would be no need to make costly modifications of the one, or to charge for unneeded complexities of the other.

Frederick S. Blackall, Jr., president and treasurer, The Taft-Peirce Mfg. Co., Woonsocket, R. I. Past President, National Machine Tool Builders' Assn. Past President, American Society of Mechanical Engineers.

"The few manufacturers who have built sound, high grade general purpose machine tools of simplified design are doing a land office business. I am not talking of 'cellar workshop' tools, either. One manufacturer of milling machines of this type was quoting, at last report, 2-year delivery.

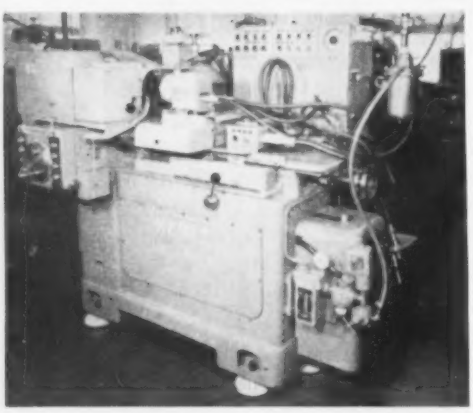
Field Wide Open . . . "His product has the accuracy needed for tool room use, plus feeds and speeds adequate for a wide range of light manufacturing operations. And it sells for less than half of the average price of the 'standard' models of light milling machines.

"There is a wide open field for comparable machines for turning, grinding and boring operations, and perhaps a host of other tools."



NO LAGGING MADE THIS PRESS "MOBILE." This 45-ton Perkins punch press was moved 200 feet — and was out of production only 5 minutes, because it was on Leveling Barrymounts.

MACHINERY THAT MOVES WITH THE TIMES CUTS COSTS



GRINDER ACCURACY PROTECTED. Leveling Barrymounts protect this Heald Size-Matic from external shock while grinding the inner races of miniature precision ball-bearings to within tenths of thousandths of an inch.

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REPORT TO MANAGEMENT..

Commies make trouble

If you are like a lot of management today you are deeply concerned about how to deal with the problem of communists in your firm.

Communist workers may be a source of real trouble in your plant --even though they have no direct access to classified information. That's because troublemaking is their stock in trade, much more so than the highly-publicized but far rarer cases of espionage or sabotage. The commies specialize in being restroom lawyers, leaders in griping.

You probably feel that the government should give you more help. And there is some sentiment in Washington to furnish you a more effective and clearcut set of ground rules.

What you can do

But the problem of plant security will remain largely up to you. Here are some of the things you can do:

(1) Check your hiring procedure to see if you can weed out poor risks before they are hired.

(2) Become as familiar with labor laws--especially passages dealing with grievances and unfair practices--as you are with your own wage agreement.

(3) Don't avoid the problem of communists in your plant as if it were an unmentionable. Meet it head on.

(4) Check the two-way channels of communication within your company. You have a right to make your views known. A letter from the president isn't enough. Remember that an organization reflects its leadership one way or the other.

(5) Be fair, but be firm.

Building a boom

Still think we're in for a depression? F. W. Dodge Corp. reports that contract awards in March for future construction in the 37 states east of the Rockies were the highest March figures in the company's 63-year history. And March rounded out the highest first quarter in Dodge history.

New highs were set for March in each basic Dodge category: Nonresidential, residential, and public works and utilities. Also, March was the seventh month out of the last 12 in which new monthly highs were set.

More than mortar

Total was $1,527,517,000, up 25 pct from February and 13 pct over March '53, best previous March. First quarter total was $3,900,764,000, 13 pct over first period '53 which was only a fraction of a point under '51 as best first quarter. Remember, these buildings have yet to be built, must then be equipped and furnished. Since these totals cover all types of construction, everybody should be able to get into the act.

Artist brews sales

Don't underestimate design as a sales factor. Consider this example: A large East Coast brewer was having trouble moving his dark beer. Seems those Easterners who like their brew dark prefer it imported. But when the brewer redesigned his labels to look "Gothic," imported, sales leaped 300 pct.

WE HARNESS UNSEEN FORCES . . .

TO GIVE YOU GREATER LIFTING POWER!

The lifted load takes on a "new look" when you swing an EC&M Type SW ALL-WELDED MAGNET into operation. Each lift is wider . . . heavier . . . and a greater pay load.

This *greater* lifting power results from the EC&M all-welded design, which permits better space proportioning for magnet windings and eliminates load-limiting air gaps. When you turn on the current, invisible magnetic lines of force flow radially out from the center pole across the load and back into the magnet case through the outer pole ring. The magnetic path is constant . . . no air gaps at pole shoes.

Whether you are handling pig or scrap iron . . .or any other ferrous materials or products . . . there's an EC&M Type SW all-welded magnet to meet your individual requirements.

CHECK THESE FEATURES: EC&M Type SW all-welded magnets are sealed against moisture . . . inner and outer poles are welded for snug fit . . . pole pieces are renewable . . . wider working surface and bigger pay loads result from elimination of recesses for bolts . . . greater mechanical strength withstands rough handling and assures longer service life . . . maximum operating efficiency means substantial savings in time and results in top economy.

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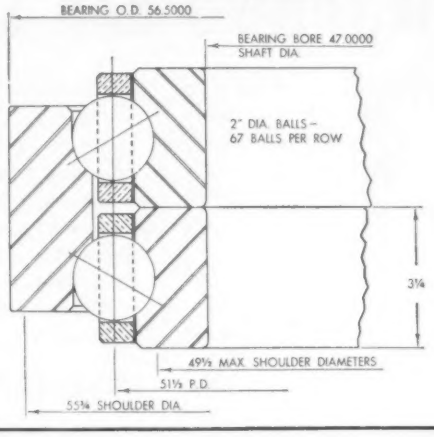
Here are the bearings that "couldn't be built"... *as produced by Kaydon*

THE manufacturer who wanted these bearings had been told they "couldn't be built." Or at least that's what he'd been told *until* he contacted **KAYDON**. What he required was a bearing 56½" in diameter combining high capacity, and exceptional precision for concentricity and face runout that would fit in limited space.

KAYDON designed a double-row angular contact ball bearing (see sketch at right). Actual tests have proved that the bearing fulfills every requirement.

If your designs require special bearings — bearings of exceptional strength, close-tolerance precision and/or very thin section — it will pay you to contact **KAYDON** of Muskegon. **KAYDON** has a long-standing reputation for accomplishing the near impossible.

CROSS SECTION — *The bearing that couldn't be built*



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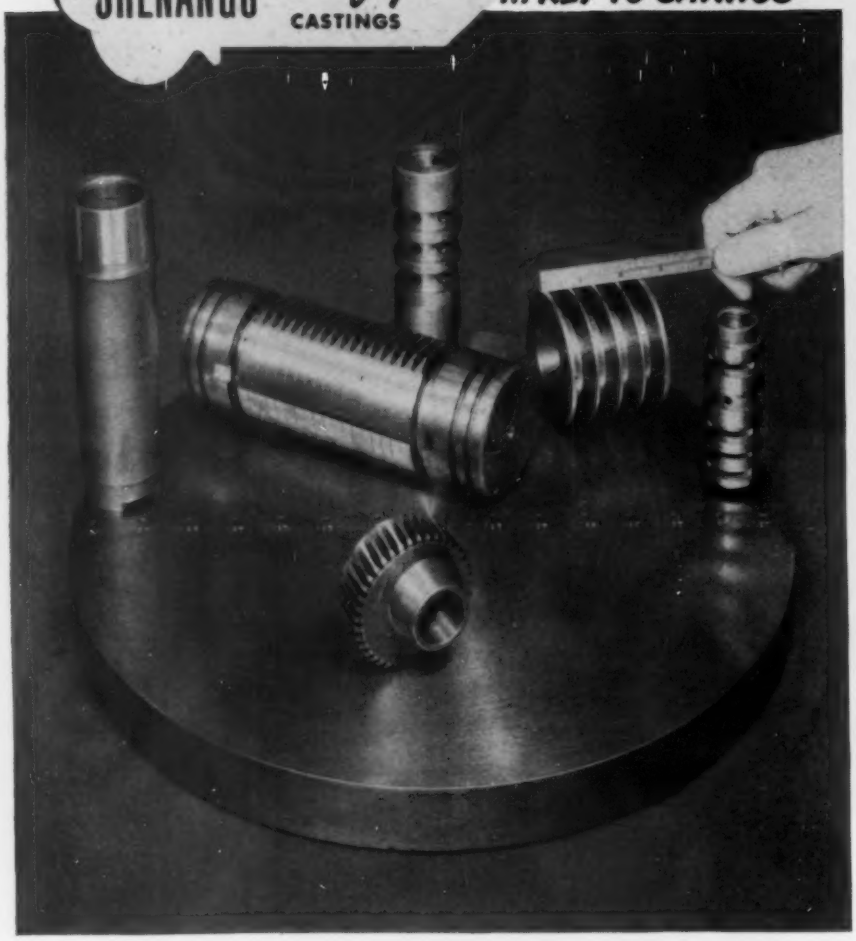

Examples of finished tool parts machined from Shenango Meehanite Metal bar stock.

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THESE complex and varied machine tool parts were made from Shenango Meehanite Metal bar stock, recognized for close grain, pressure tightness, uniform hardness and exceptional wear resistance.

In addition, the uniformity of Meehanite Metal permits machining at increased speeds. It takes a fine, smooth finish in any cutting, honing, or grinding operation. Can be heat-treated too. When you specify Meehanite Metal bar stock you receive longer wear, minimum machining loss and freedom from defects.

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— Free Publications —

Continued

Cap screws

Chandler Products Corp. announced the publication of new 4-p. catalog which features a variety of fasteners which are representative of the different types and standards company manufactures. Among the types shown are special automotive bolts, Place self locking bolts and connecting rod bolts. *Chandler Products Corp.*

For free copy circle No. 20 on postcard, p. 151.

Dust control

How dust can be controlled in industries working with asbestos is discussed in new bulletin. Four case histories are presented which show how Dustube cloth-tube-type dust collectors are employed to ventilate various dust producing machines in these industries. *American Wheelabrator & Equipment Corp.*

For free copy circle No. 21 on postcard, p. 151.

Visual control

Introduction of custom sizes and a wider range of applications for the Boardmaster Visual Control System has been announced. Boards may now be ordered whether larger or smaller than the standard size to fit specific applications. New panel attachments permit greater flexibility in displaying boards. *Graphic Systems.*

For free copy circle No. 22 on postcard, p. 151.

Fork truck

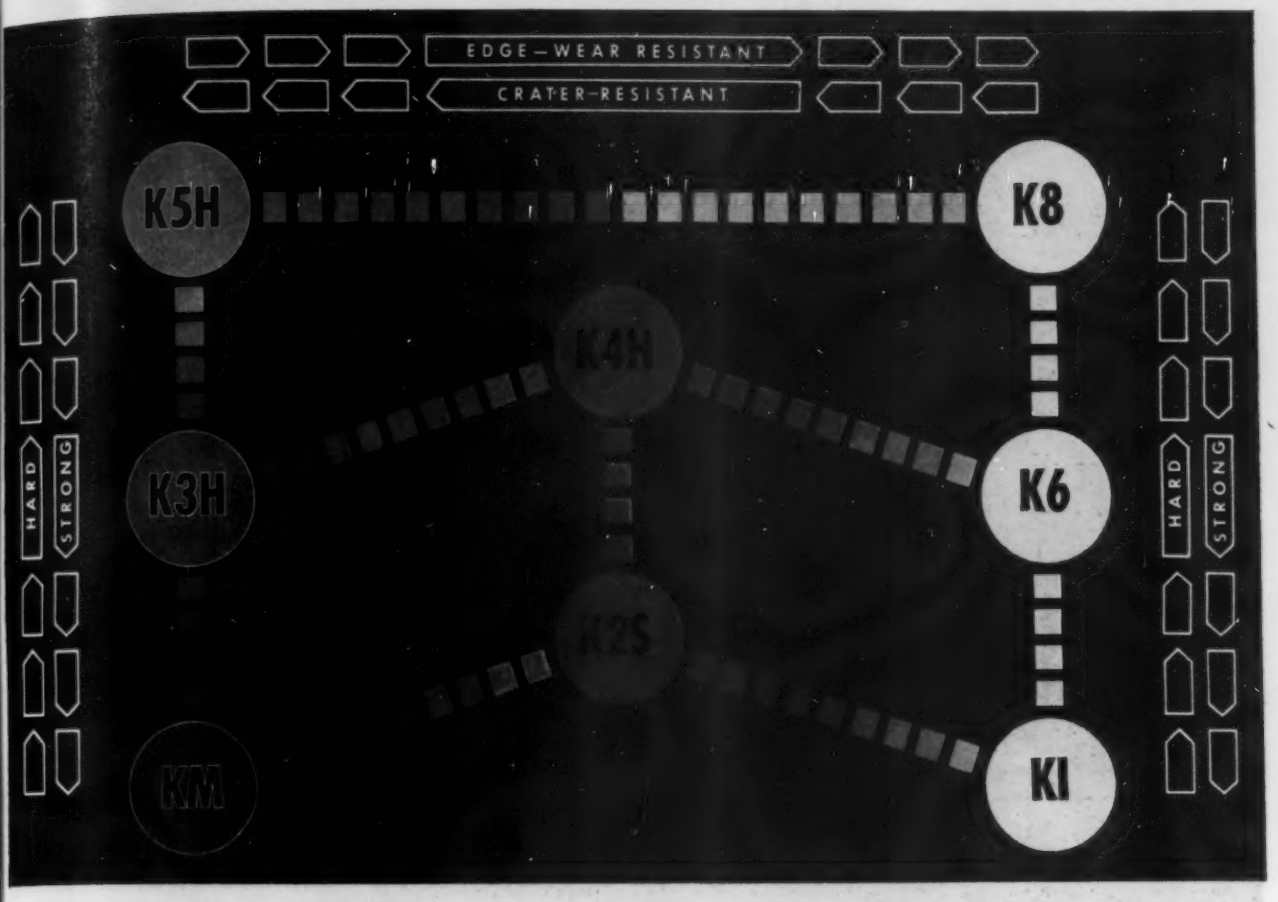
Model F-39T10 electric powered 10,000 lb capacity fork truck is illustrated and described in new folder. Truck has been designed to provide a heavy-duty machine capable of providing dependable and economical operation under severest operating conditions. *Elwell-Parker Electric Co.*

For free copy circle No. 23 on postcard, p. 151.

pH control

Informative report on role of automatic pH control in industry, to help executives, process engineers and chemists better understand this important technique, has just been released by Beckman Instruments, Inc. The 12-p. brochure gives a picture of continuous pH recording and control in three major processing areas—water treatment, control of chemical reactions, and waste disposal. Simplified diagrams and sketches describe typical pH installations for a variety of processes. *Beckman Instruments, Inc.*

For free copy circle No. 24 on postcard, p. 151.



NOW! A Quick, *Easy-to-Use* Guide to Efficient Machining

Here's the first simplified system for selecting carbide tool grades. Kennametal's new grade selection method assures top tool performance on every machining job. It's easy to use and eliminates guesswork because grades are grouped according to their wear characteristics (edge-wear and crater-resistant); also according to relative strength with strong, intermediate and hard grades included in each group. These eight Kennametal grades meet all machining requirements.

Kennametal's grading system is unmatched in the industry for simplicity. Any experienced machinist can use it to quickly adjust grades for better tool performance. For example: If K3H is being used and crater is no problem, a switch to K4H, which is more edge-wear resistant, will provide longer tool life. Conversely, if K4H is being used and crater is excessive, a switch to K3H would improve tool life.

Your Kennametal representative will gladly help you apply this grade selection system to your machining operations. He can also help apply these eight grades to "wear spots" in your product, your processing lines, or any place a hard, wear-resistant metal is needed. Just give him a call. Kennametal Inc., Latrobe, Pa.

Learn WHY

"IT PAYS TO BE A GOOD TOOL DETECTIVE"

"It Pays to Be a Good Tool Detective" will be the topic for Wednesday, April 28, at 9:00 A.M., at the Carbide Seminar. Kennametal engineers will discuss selection of proper grades, feeds, speeds, depth of cut, clues to tool trouble, and solutions.

The Carbide Seminar, sponsored by ASTE, will be held at the University of Pennsylvania's Towne School, near the Convention Hall.

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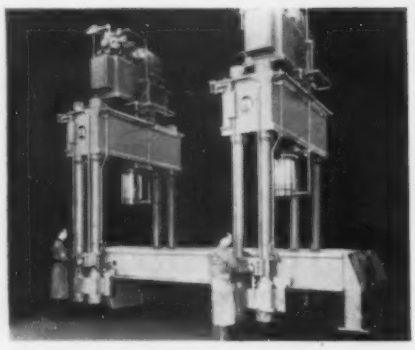
NEW EQUIPMENT

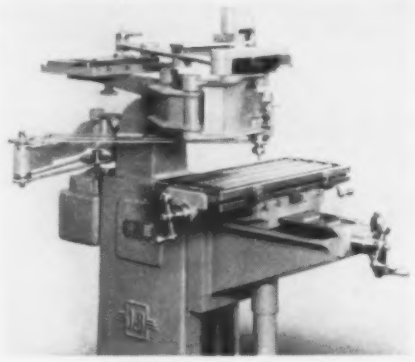
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 151 or 152



Straightening press with two pressure units

A two-way straightening press with two pressure units was designed to straighten parts such as forgings, castings, extrusions and weldments where it is necessary to hold down one point while applying pressure to another point or to apply pressure at two points simultaneously. Spot pressure can be applied over practically the entire press bed area because the two pressure units have both longitudinal and traverse movement. Each pressure unit has a pressure capacity of 400 tons and the bed is 264 in. long x 96 in. wide. From each ram nose to the bed is 60 in. and each ram has a 24-in. stroke. *Hydraulic Press Mfg. Co.*

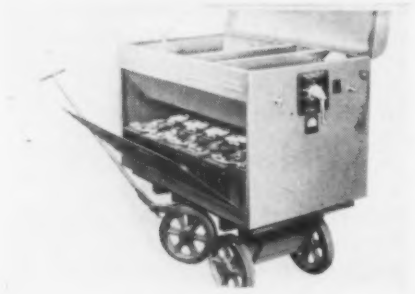
For more data circle No. 25 on postcard, p. 151.



Pantograph engraver is two-dimensional machine

New two-dimensional pantograph engraver is designed for production engraving, profiling, die-cutting, and milling in steel, cast iron, nonferrous materials, and plastics. With spindle locked, it also does conventional milling. Sturdily constructed of stress-relieved Meehanite, and equipped with precision ball bearings at all critical points, this machine is said to have remarkably free arm action and sensitivity. Exact settings of pantograph reductions from 1:1 to 1:40 are easily practical, and spindle speed, controlled by a simple dial, is infinitely variable from 1200 to 1500 rpm. Copy table is 10½ x 16 in. *Johnson & Bassett, Inc.*

For more data circle No. 26 on postcard, p. 151.



Battery unit supplies power for welding studs

Independent power for welding studs up to ½ in. base diam is supplied by a new portable battery unit. It is recommended for stud welding where no power lines are available or when existing lines are unable to handle stud-welding current in addition to their regular load. Completely integrated and independent of power lines, except for recharging, the unit may be used to operate any electrical equipment within its power capacity. A tap selector switch regulates current supply. *KSM Products, Inc.*

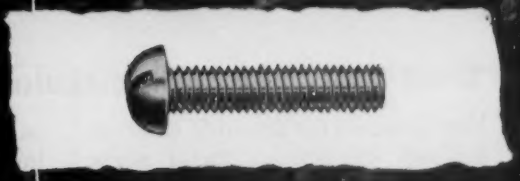
For more data circle No. 27 on postcard, p. 151.

Converging conveyors served by elevating table

To solve the problem of providing an adjustable table that could be turned and elevated to serve several conveyor lines, a round top was designed for a standard elevating table. The top revolves freely and can be locked in a single position. A 16-in. range of height is provided allowing the top to be fixed at any height between 28 and 44 in. Capacity is 2000 lb. The table is portable but can be held in position by a floor lock. Hydraulic elevation and lowering is controlled by foot pedals on the pump which is mounted on table base. *Raymond Corp.*

For more data circle No. 28 on postcard, p. 151.

Turn Page

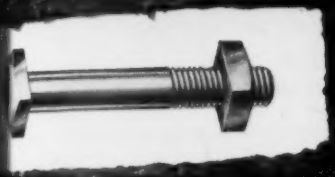


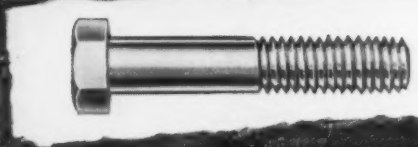
building

a **solid** reputation

over

35 years

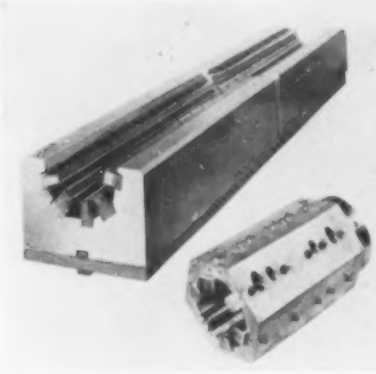




STERLING BOLT COMPANY

General Offices: 363 West Erie Street • Chicago 10, Illinois

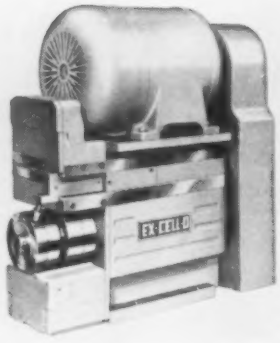
Manufacturing Plants: Chicago • Milwaukee • St. Louis



Steel broaches finish circular metal parts

New broaches for finishing external surfaces on circular metal parts such as slots, flats, notches and contours are made in a variety of sizes in two general types—external surface broach type and an internal type. The surface broach can be mounted on the ram of conventional single or dual ram surface broaching machines. It broaches up to half of the periphery of a part in a single pass. For broaching around the entire periphery the part is indexed and completed by a second pass of the broach. Internal broaches are mounted on the table of utility hydraulic presses and finish the entire periphery of the part as it is pushed down through the broach. *National Broach & Machine Co.*

For more data circle No. 29 on postcard, p. 151.

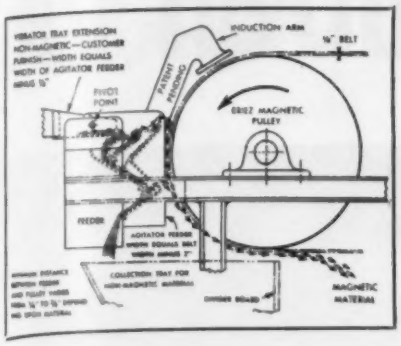


Power unit feeds and rotates cutting tools

Quill type hydraulic power unit for actuating tools in special machines has a capacity of 3 hp and a stroke of 8 in. A companion unit has a 12-in. stroke; is a little longer. The new models are self-contained, hydraulically operated, and designed to accommodate single tools or multiple spindle heads for such operations as drilling, reaming, counterboring and spot facing. The unit cycle may be initiated electrically or manually and may include rapid approach, first and second feeds, reverse, rapid return and stop. Lengths of rapid approach and feed movements, the reverse and stop positions are controlled by adjustable dogs. *Ex-Cell-O Corp.*

For more data circle No. 30 on postcard, p. 151.

Never too hot, never too heavy
MAY-FRAN
Here's a conveyor belt built to take it . . . to last as lon
as the machinery it serves! Once installed, it's in to sta
MAY-FRAN engineers poured abrasive carborundum du
continuously on operating belt for a prolonged period
time . . . and it came through this grueling test still intac
and serviceable!
You may not want to transport carborundum dust — but
you have foundry castings . . . die castings . . . hot forge
1748-MF
Outside links incorporate interlocking wings . . . remain positively engaged at all times. New interlocking flanges permit staggering of links . . . eliminate lateral movement.
MAY-FRAN



Unit separates high grade magnetic residue

Reclaiming steel containing expensive metals such as nickel, cobalt or tungsten, chromium, etc., from non-magnetic materials is possible with a new magnetic agitator separator. The unit is a practical means of separating metals having a magnetic content of 20 pct or more. It combines an agitator feeder with a non-electric magnetic belt-pulley. The magnetic portion of the material fed into the agitator tumbles across inclined baffles until it reaches the pulley, where it is held securely on the moving belt which passes it beyond the magnetic field. At this point it drops automatically into a tray. *Eriez Mfg. Co.*

For more data circle No. 31 on postcard, p. 151.

Lightweight radiation detector fits in pocket

Pocket-size radiation detector is approximately 1.7 in. thick, 4.1 in. wide, 6.6 in. high and weighs about 25 oz. It is designed for locating sources of beta and gamma radiation; is useful for measuring radiation exposure of laboratory workers and for checking intensity levels during research investigations. It can be employed in studies of radioactive contamination and in work with radioactive sources and tracers. Also can be used for X-ray monitoring. The instrument is assembled in an air-tight, tropic-proof plastic case with rubber lead-in and washers. Separate probe is not needed since the entire unit serves this purpose due to its midget size and weight. *North American Philips Co., Inc.*

For more data circle No. 32 on postcard, p. 151.

Turn to Page 162

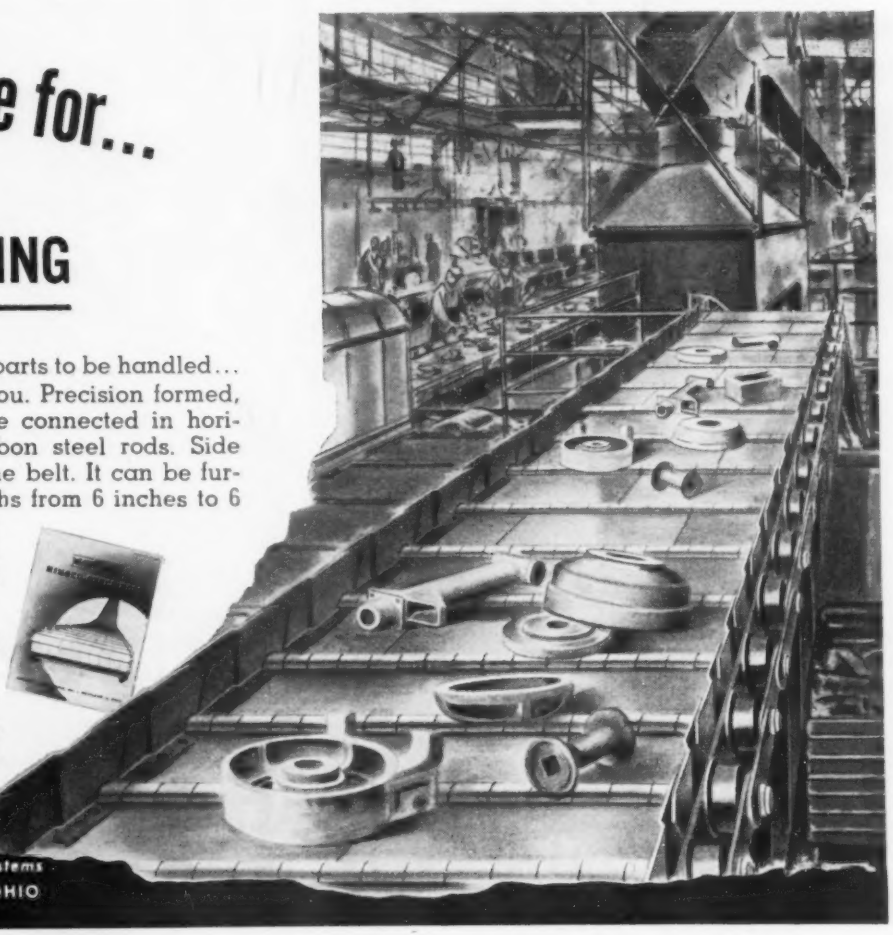
never too abrasive for...

HINGED-STEEL BELTING

items...hot, heavy or abrasive metal parts to be handled... MAY-FRAN hinged-steel belt is for you. Precision formed, heavy-gauge hinged-steel links are connected in horizontal rows by means of high-carbon steel rods. Side chains become an integral part of the belt. It can be furnished to your specifications in widths from 6 inches to 6 feet and in any length or carrying capacity. Both solid and perforated links are available in 2½ to 12-inch pitch lengths.

If you want conveyor belting that can withstand the roughest usage, specify MAY-FRAN hinged-steel belt!

Write today for complete information

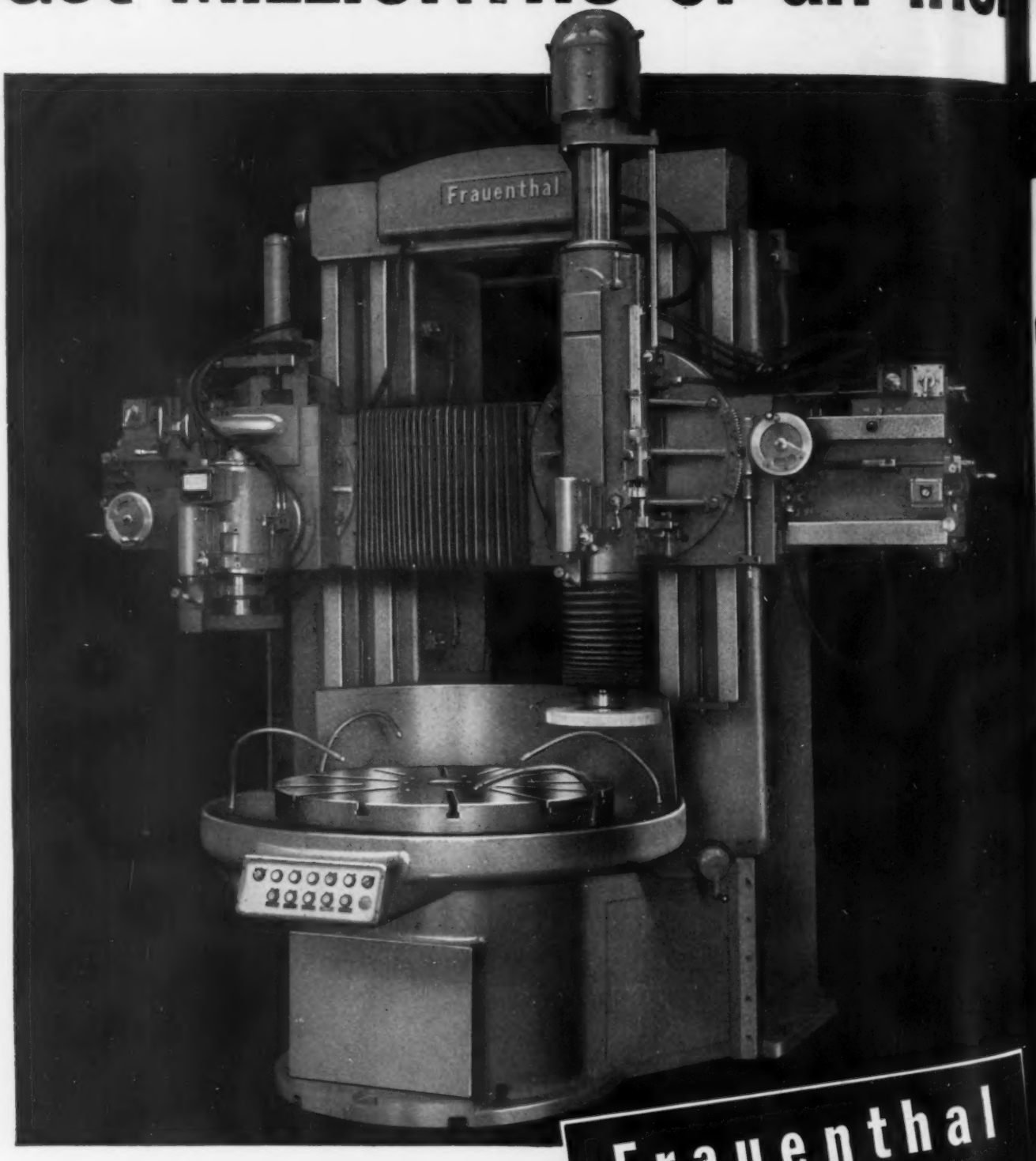


ENGINEERING, INC.

Designers and Builders of Complete Handling Systems

1698 CLARKSTONE ROAD • CLEVELAND 12, OHIO

Get MILLIONTHS of an inc



This 1800 Series Frauenthal Grinder was specially engineered with direct-connected spindle and quill-type spindle (25" stroke) for fast precision-grinding of vital aircraft engine parts to millionths-of-an-inch tolerance.

Frauenthal

MULTIPLE-HEAD SUPER-PRECISION CYLINDRICAL **Grinders**

PRECISION-GRIND INSIDE, OUTSIDE AND FACES SIMULTANEOUSLY TO MILLIONTHS OF AN INCH!

PRECISION at low cost with Frauenthal Grinders

Grind to "AIRCRAFT Precision"... faster!

On all of your own toolroom and production grinding, you can get the super-precision demanded in grinding the most accurate aircraft parts by using Frauenthal "millionths-of-an-inch" grinders. Through more than a decade these grinders have been performance-proved on the toughest precision jobs . . . grinding parts for aircraft, jet and automotive engines; cranks; gunmounts; radar units; Diesel connecting rods; plug valves; large diameter high precision bearings and other industrial and military parts and assemblies, consistently, to *fractions of ten-thousandths,* best expressed in *millionths* of an inch!

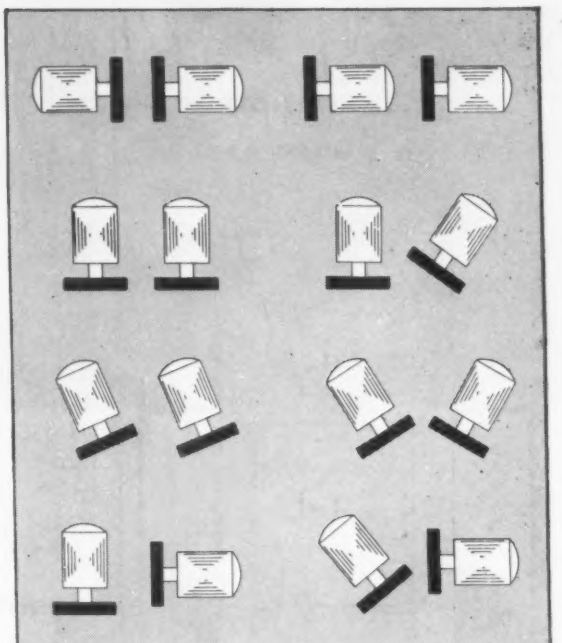
Save time and money by SIMULTANEOUS grinding of inside and outside diameters or faces

With Frauenthal Multiple-Head Cylindrical Grinders you save important time and lots of money because *simultaneous* grinding of *related surfaces* assures utmost precision and unfailing interchangeability of parts. Adaptations for super-precision boring or turning also can be engineered into these grinders for specific jobs.

What's YOUR Grinding problem?

Tell us, in confidence, what you want to grind. Frauenthal Grinders permit many combinations of grinding-spindle positions for a wide variety of simultaneous grindings of outside and inside diameters or faces. Large diameters can be ground to the extremely close tolerance of .000200" (200-millionths of an inch) *or better,* with assurance of uniform precision in concentricity, parallelism and roundness. Valuable details on request. We'll be glad to work with you on difficult grinding, boring, turning problems.

Many combinations of spindle positions for simultaneous grinding on all sizes of Frauenthal grinders



TEN STANDARD SIZES conforming to essential J.I.C. specifications

SERIES	TABLE SIZES	MAXIMUM SWING
1800	30"	60"
	36"	60"
	42"	60"
	48"	60"
2000	60"	72"
	72"	88"
2200	110"	120"
	120"	130"
	130"	140"
	140"	150"

WRITE FOR BULLETIN

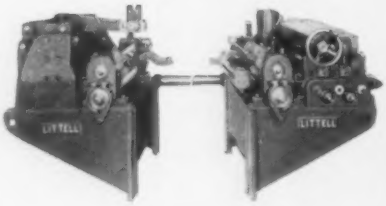
Frauenthal Division

THE KAYDON ENGINEERING CORP. • MUSKEGON, MICHIGAN

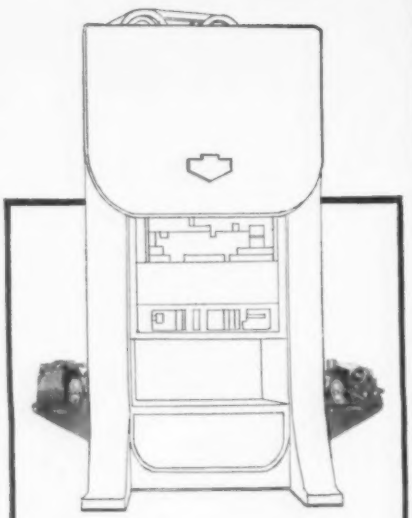
the right combination for pressroom AUTOMATION

is a

LITTELL ROLL FEED



mounted on a new punch press



Precisely the right roll feed for your needs is in the complete Littell line . . . whatever the make or size of your press.

Write for the LITTELL Roll Feed Catalog

F. J. LITTELL MACHINE CO.

4141 N. Ravenswood Ave., Chicago 13, Ill.

Positioning cutters

The problem of handling and positioning a heavy, hard-to-handle, razor-sharp gear cutter is simplified by using a castered table designed for the purpose. With the

table the cutter can be removed at the right height and in the correct position to be engaged by a swinging arm on a Gleason Gear Cutter, which positions the tool in the limited quarters in which it is mounted. The tilted cutter support, on the table, is framed by wooden retainer strips to protect the costly tool blades against nicking. *Eaton Mfg. Co.*

For more data circle No. 33 on postcard, p. 151.

Counterbores

High speed steel counterbores and spot facers with interchangeable pilots are being manufactured in four styles—long and short set in

both straight and taper shank. Two additional styles are made for the aircraft industry — long set and short set with ¼ in. shanks, for use with portable equipment. To insure rigidity and permanent alignment, all styles are made with cutter and shank integral and with cutting edges well backed. *Union Twist Drill Co.*

For more data circle No. 34 on postcard, p. 151.

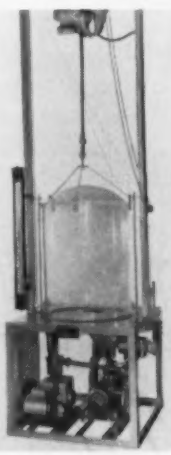
New infrared lamp

Development of a new type infrared lamp said to be "of tremendous potential" for scores of heating, drying, baking and other uses, is a radical departure from any previous infrared lamp in two respects. It comes in a compact tubular shape, slightly larger in diameter than a cigarette. And the tube is made of a fused translucent quartz. The slender quartz lamp can withstand high temperatures and the shock of violent temperature changes. Two sizes are being introduced, 500 and 1000 w, for use on circuit voltages of 115-125 and 230-250, respectively. *General Electric Co.*

For more data circle No. 35 on postcard, p. 151.

Vacuum test chamber

A complete unit being tested in a new type vacuum chamber can be observed at all times. The unit is



particularly suited to laboratory testing and development work. The jar, which encloses a working space 24 in. high x 24 in. diam, cannot be raised unless the controls are in the dive position. Capable of altitudes up to 100,000 ft. *American Research Corp.*

For more data circle No. 36 on postcard, p. 151.

For new equipment to be displayed at the ASTE Show see page 198

The Iron Age

SALUTES

Roger F. Waindle

He brings to the ASTE presidency varied industrial experience and skill in solving complex problems.

IT takes a lot of varied experience to prepare a man for the presidency of a national technical society. But there's no doubt that Roger Waindle, president of American Society of Tool Engineers, fills the bill.

His experience at unusual jobs started when he worked his way through Illinois Institute of Technology as a special policeman for a business protection service. Closest call came when he arrived just as burglars who had blown open a store safe were leaving.

After graduation he wasted no time in showing his ingenuity. Trying for a job with a furnace firm, he was told he lacked experience. Roger promptly got to know the firm's best customer, ended up being introduced by him to the furnace maker.

Other industrial experience includes a stretch as marine engineer on the old *S.S. Leviathan.* During World War II he was chief of production of Chicago Ordnance District's Tank & Automotive Div., and an advisor to War Production Board.

During the war he was named general manager of Elgin Watch Co.'s Industrial Products Div. He was there when Korea flared up, set records by producing and delivering new-type rocket fuses in 20 days from receipt of order.

Roger now alternates between his ASTE duties and consulting work on advanced metallurgical and tooling problems for his Waimet Engineering Co. Married, he complains that he doesn't see enough of his wife and two children—9 and 11. Other interests include his membership in New York Academy of Sciences and Newcomen Society.

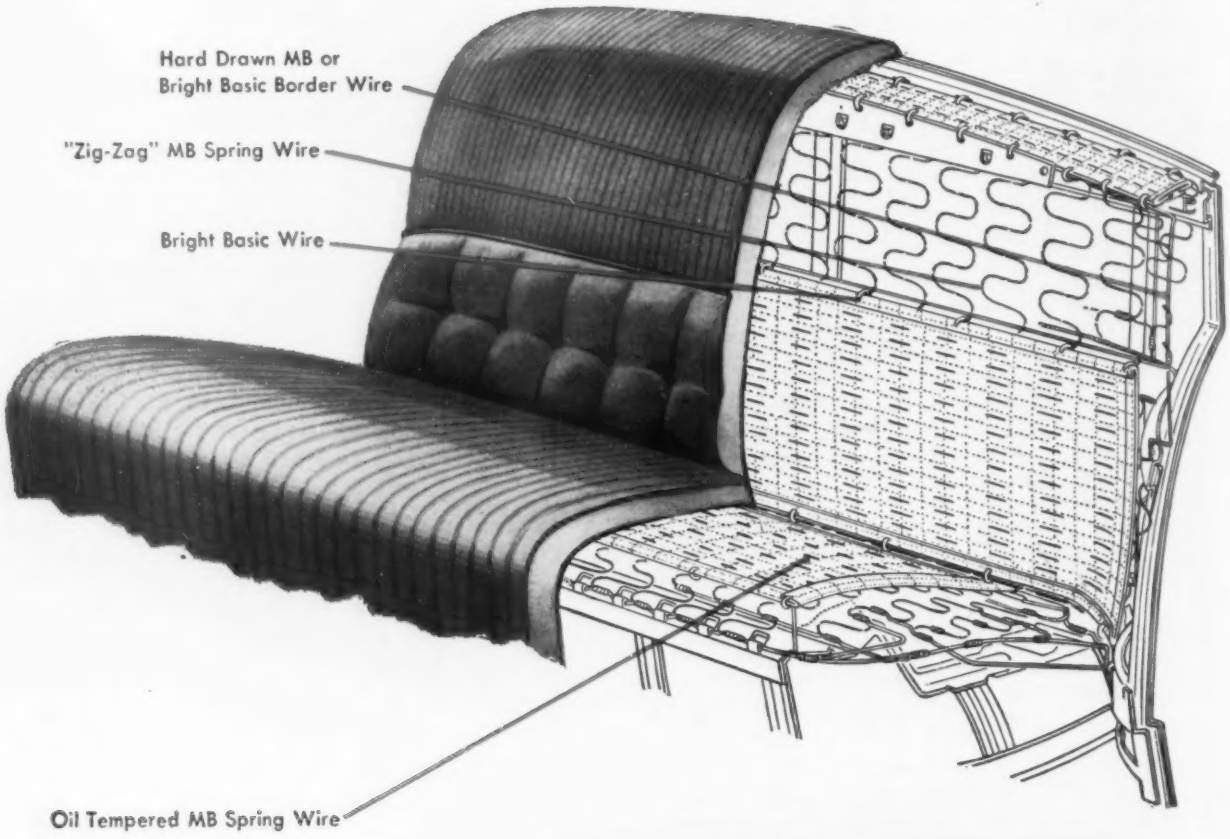
riding comfort starts with

Wickwire Wire

New types of spring construction for seat and back cushions add immeasurably to the smooth, easy-riding comfort of today's automobiles.

Here again, as in so many other instances, the complete range of Wickwire Wire—high or low carbon, in all tempers, finishes and grades—provides exactly the right kind of wire for all parts of the complete spring assembly.

Good reason why Wickwire Wire is selected for the cushion spring units on many of America's leading makes of cars. Good reason, too, why it will pay you to remember—For The Wire You Require; Check First With Wickwire.



THE COLORADO FUEL AND IRON CORPORATION—Denver & Oakland
WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo
Chicago • Detroit • New Orleans • New York • Philadelphia

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CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

2014

The Iron Age

INTRODUCES

Walter A. **Marting**, elected a vice-president, THE M. A. HANNA CO., Cleveland; and **W. C. Pieper**, promoted to treasurer.

Milton F. **Lepper**, named vice-president in charge of brokerage, UNITED IRON & METAL CO., Pittsburgh.

H. George **De Young**, elected a director, ATLAS STEELS, LTD., Welland, Ont.

Don L. **Orton**, appointed north central regional manager, FEDERAL ELECTRIC PRODUCTS CO., and the Pacific Electric Mfg. Co., a wholly owned subsidiary.

Dr. **Joseph W. Barker**, elected director, NATIONAL MALLEABLE & STEEL CASTINGS CO.; and **Carter Kissell**, named director also.

Louis B. **Neumiller**, elected chairman of the board, CATERPILLAR TRACTOR CO., Peoria, Ill.

Robert J. **Burnup**, appointed sales engineer, Houston district office, covering the states of Louisiana and Texas, BALDWIN - LIMA - HAMILTON CORP.

Harry **Lange**, promoted to chief engineer in charge of bolt, nut, screw and rivet machinery division, WATERBURY FARREL FOUNDRY & MACHINE CO., Waterbury, Conn.

Orville T. **Barnett**, named supervisor of welding research, Armour Research Foundation of ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago.

Frank A. Neer, joins division sales department, U. S. STEEL CORP.'s Columbia-Geneva Steel Div., Salt Lake City.

Seymour Weinstein, appointed technical director, Niagara Filters Div., AMERICAN MACHINE & METALS, INC., East Moline, Ill.

R. R. Hoover, named chief engineer, CONSOLIDATED VULTEE AIRCRAFT CORP., San Diego; and **W. S. Ivans**, promoted to chief electronic engineer.

Marion V. Bailliere, Jr., appointed controller, MORSE CHAIN CO., subsidiary of Borg-Warner Corp., Chicago.

Edwin Ruh, becomes research engineer, Hays Laboratory, Pittsburgh, HARBISON-WALKER REFRACTORIES CO.

Wilfred Turbeville, named to the newly-created post of manager of industrial foil sales, with offices in Pittsburgh, ALUMINUM CO. OF AMERICA.

Claude Smith, promoted to manager, Dayton, O., regional office, Aeronautical Div., MINNEAPOLIS-HONEYWELL REGULATOR CO.

Joseph P. Villo, appointed division manager, Aircraft & Allied Products, STANDARD PRESSED STEEL CO.; and **Frederick D. Fernsler**, becomes manager, Unbrako-Flexloc Div.

Harold A. Kahler, appointed general sales manager, Eastern Div., Fromat Div., POOR & CO.

ALEXANDER H. d'ARCAMBAL, elected president, Niles-Bement-Pond Co., West Hartford, Conn.

T. J. AULT, promoted to president and general manager, Detroit Gear Div., Borg-Warner Corp., Chicago.

HARMON S. EBERHARD, elected president, Caterpillar Tractor Co., Peoria, Ill.

Personnel

Angus V. McLeod, appointed manager of traffic, KAISER ALUMINUM & CHEMICAL CORP., Oakland, Calif.; and **Duncan S. Gregg,** appointed manager of purchasing.

A. W. Emery, Jr., appointed manager of distributor and specialty divisions, WESTINGHOUSE ELECTRIC CORP., Industrial Advertising and Sales Promotion Dept.

Harris C. Miller, promoted to assistant district sales manager, New York district sales office, HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y.; and **Dr. Frank W. Long,** transferred to the sales development group of the sales department.

Lester J. Wolfe, appointed Chicago district sales manager, PENNSYLVANIA INDUSTRIAL CHEMICAL CORP., Clairton, Pa.

George Herrick, transferred to Detroit sales office, CLEARING MACHINE CORP.

Robert O. Sauer, named manager, new Advance & Development Unit, Engineering Section, Silicone Products Dept., GENERAL ELECTRIC CO.

J. T. Sherman, named head of the metals process section of the Sales Dept., CHEMICAL CONSTRUCTION CORP.

R. H. Christenson, appointed sales and service representative, Chemical Processing Div., East-Central Region, Detrex Corp., Detroit.

Thomas J. Gerwig, appointed assistant district sales manager, REPUBLIC STEEL CORP., Chicago district.

Fred A. Craine, appointed general credit manager, DIAMOND ALKALI CO., Cleveland.

Albert Patnick, appointed dealer sales manager, THE LINCOLN ELECTRIC CO., Cleveland.

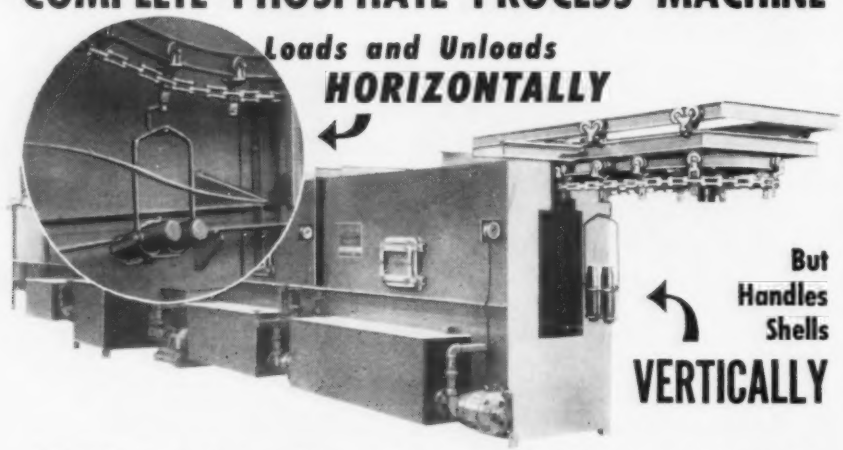
W. J. THOMAS, named vice-president, The Babcock & Wilcox Co., New York.

RICHARD W. BANFIELD, named executive vice-president, Niles-Bement-Pond Co., West Hartford, Conn.

L. G. GRAPER, vice-president, research and development, named to vice-president, operations, Lone Star Steel Co.

J. A. CROOKS, appointed assistant to vice-president, Bethlehem Pacific Coast Steel Corp.

NEW ALVEY-FERGUSON 5-STAGE COMPLETE PHOSPHATE PROCESS MACHINE



BECAUSE a *vertical position* in the finish-cleaning operation assures a more uniform spray coverage and more complete drainage—

. . . BUT a *horizontal position* at the *loading* and *unloading stations* permits the operator to slide the 120 M M shells to and from a storage table or belt conveyor into—and out of—the trolley conveyor attachments without lifting the shells . . .

. . . Alvey-Ferguson designed this Phosphate Processing Machine with Special Hinged Type Fixtures which speeds up the cleaning and surface-preparation-for-paint operations to 360 shells per hour.

Alvey-Ferguson Engineers solve many tough-to-crack-problems in the metal products cleaning field. May we help you solve yours? Write without obligation—today.

THE ALVEY-FERGUSON CO., 561 Disney St., Cincinnati 9, Ohio

Offices or Representatives in Principal Cities.

Personnel

Continued

H. M. Campbell, appointed general manager, Metals Div., OLIN INDUSTRIES, INC.; and **R. A. St. Clair,** named general manager, Electrical Div.

Alfonso Tammaro, promoted to assistant general manager for research and industrial development, U. S. ATOMIC ENERGY COMMISSION; **John J. Flaherty** becomes manager, Chicago operations office.

Robert Lakin, promoted to assistant sales manager, Dayton, Ohio, headquarters, Delco Products Div., GENERAL MOTORS CORP.; and **Mark Rasper,** promoted to manager, Detroit office.

Robert A. Crawford, appointed superintendent, Hot Sheet Mill, Allenport, Pa., PITTSBURGH STEEL CO., Pittsburgh; and **Anthony Thomas,** promoted to head roller.

Frank A. Weil, appointed southern representative, BLAW-KNOX CO., Chemical Plant & Buflovak Equipment Divisions.

Harry E. Fisher, "charter member" of the Seamless Tube Dept., Aliquippa Works Div., JONES & LAUGHLIN STEEL CORP. retired recently.

OBITUARIES

Henry Duckworth, 82, retired vice-president, Norton Co., Worcester, Mass. He had worked for Norton for more than 60 years.

Horace M. Lawrence, 64, national leader in the field of building and construction standards for over 23 years, recently, at Holy Name Hospital, Teaneck, N. J. He was in charge of standardization projects for building codes, construction operations, materials and mining for the American Standards Assn., New York.

Alonzo F. Allen, retired secretary-treasurer, American Steel & Wire Div., U. S. Steel Corp.

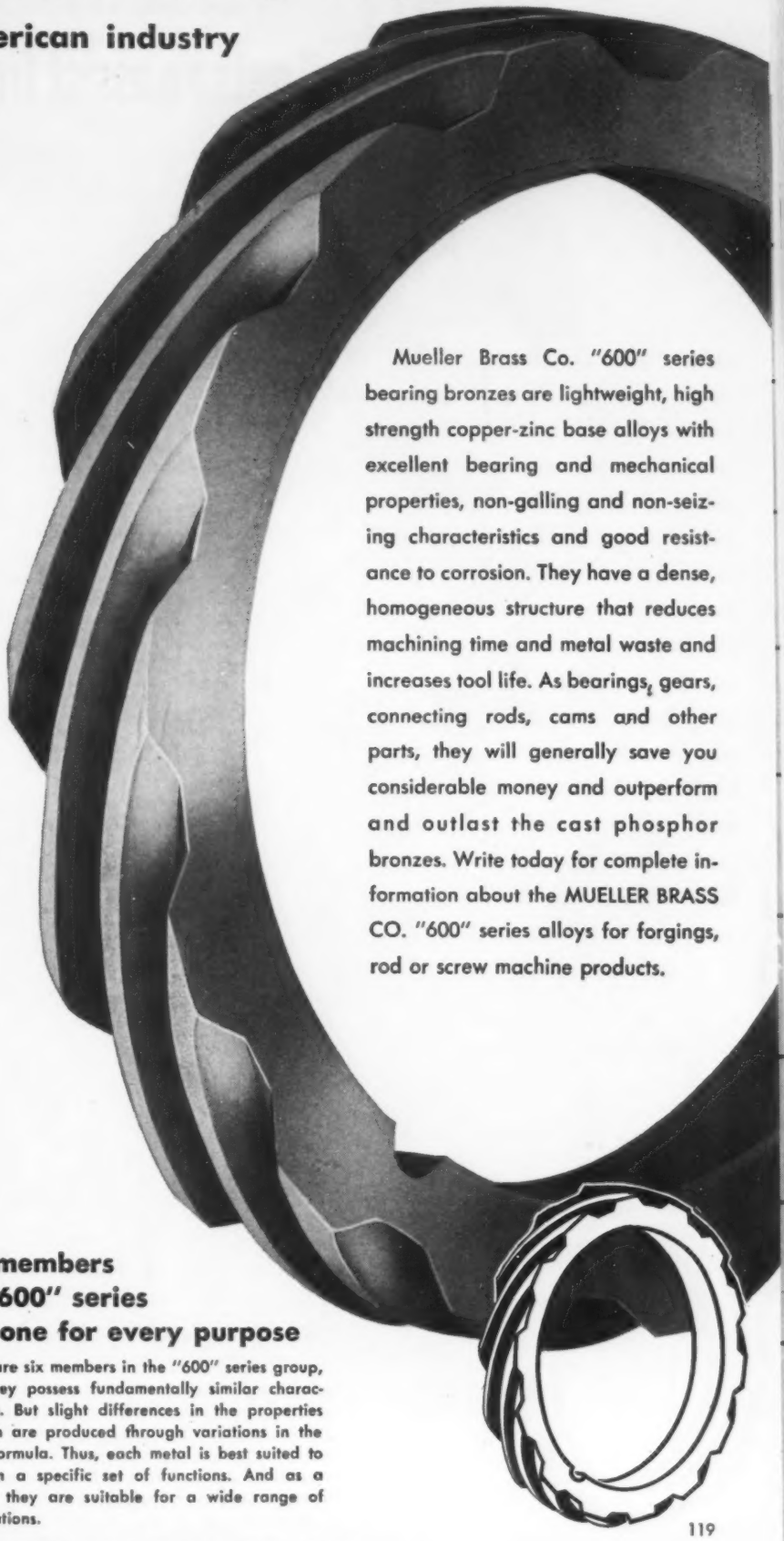
MUELLER BRASS CO.

600 SERIES BEARING ALLOYS

FORGINGS • ROD • SCREW MACHINE PRODUCTS

proving their quality throughout

American industry



Mueller Brass Co. "600" series bearing bronzes are lightweight, high strength copper-zinc base alloys with excellent bearing and mechanical properties, non-galling and non-seizing characteristics and good resistance to corrosion. They have a dense, homogeneous structure that reduces machining time and metal waste and increases tool life. As bearings, gears, connecting rods, cams and other parts, they will generally save you considerable money and outperform and outlast the cast phosphor bronzes. Write today for complete information about the MUELLER BRASS CO. "600" series alloys for forgings, rod or screw machine products.

six members of "600" series . . . one for every purpose

There are six members in the "600" series group, and they possess fundamentally similar characteristics. But slight differences in the properties of each are produced through variations in the basic formula. Thus, each metal is best suited to perform a specific set of functions. And as a group, they are suitable for a wide range of applications.

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MUELLER BRASS CO. PORT HURON 24, MICHIGAN

Another job done right with Inland **job-right** *cold rolled sheets*

Careful steel buying has helped Waterloo Valve Spring Compressor Company of Waterloo, Iowa become the No. 1 manufacturer of metal boxes and chests. They produce a product that's right, at a price that's right for giant retail chains and mail order houses. These outlets insist on uniformly strong and handsome tool, tackle and utility boxes. And Inland cold rolled sheets help keep these critical customers satisfied.

Steel "box-ing champ" gets an assist from Inland cold rolled sheets

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"The right temper is our most important steel sheet requirement," says purchasing agent M. J. Karpan (left). "Sheets that are too hard spring back after bending. Softer sheets lack strength. And, of course, our sheets must be uniformly flat. For years, shipment after shipment of Inland cold rolled sheets have worked right for our jobs."

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The Iron Age
FOUNDED 1855
Tool Engineers Issue

TOOLING FOR COMPETITION

PROGRESSIVE DIES
precision stampings

AUTOMATICS
profits on short runs

CUTTING FLUIDS
needs for new alloys

PLASTIC TOOLING
new methods, uses

HIGH SPEEDS
cut metal removal cost

AUTOMATION
for crankpin grinding

WORK HANDLING
fixtures raise output

DIAL FEEDS
combine press operations

SHOW PREVIEWS
new products exhibited

SHOW PROGRAM
papers, date, time, place

Photo courtesy Richardson Scale Co.

Quick die changes—

PRECISION STAMPINGS: Progressive Die Setups Permit High Output

By J. I. Feldborg
Master Mechanic, Dies & Sheetmetal
Highland Park Plant
Chrysler Corp.
Detroit

◆ Exacting requirements for high production of major stampings for Chrysler's new torque converter are being met by a 350-ton, 5-station progressive die setup . . . Torus rings are produced at rates up to 60 pieces per min . . . Curvature of stampings and outside diameter are held within 0.004 in.

◆ Automatic feed of coiled steel is synchronized with fast press action . . . Control buttons provide inching, single stroke, non-repeat and continuous operation . . . Setup requires minimum time for die and coil changes . . . Greater production per square foot of floor space is achieved with minimum manual handling.

◆ ECONOMIES of progressive die setups for volume production of critical stamped parts is well established in the mass production industries. An excellent example is the production of torus rings for the torque converter used in conjunction with Chrysler Corp.'s new Powerflite automatic transmission.

At its Highland Park plant, Chrysler is producing accurate, major torque converter stampings at rates up to 60 pieces per min. Cold rolled steel is fed automatically between press strokes into a 5-station, 350-ton Henry and Wright press which combines drawing, notching, piercing, flanging and trimming in a series of progressive dies. The partially completed stamping remains joined to the steel strip until the final operation. Final trimming and coining operations are performed on manually-fed individual presses.

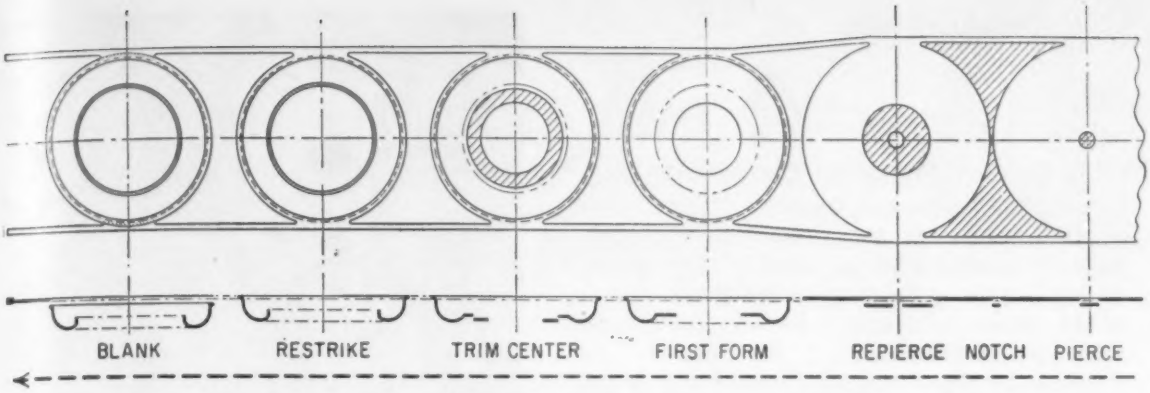
Since a total of 82 stamped parts, including two torus rings, 78 fins and 2 outer shells will be brazed into two sub-assemblies, tolerances for all torque converter parts are necessarily tight. Outside diameter and curvature of the torus ring is held to 0.004 in. Special gages check parts periodically against rigid specifications.

Because of the growing volume requirements for Chrysler Powerflite automatic transmissions, its new 350-ton press is used exclusively for four, slightly different torus rings required for the Chrysler, Dodge, De Soto and Plymouth passenger car lines. Parts are stamped from SAE 1010-15. Gage of the cold rolled steel is 0.050 in. Maximum coil diam. is 54 in. Maximum coil weight is 10,000 lb.

Air hardened tool steel dies are required for this application. Sectionalized progressive dies are worked to tolerances of less than 5 pct of the material being stamped. For this particular application, the upper die or punch as well as the lower die were built in three sections which are rigidly mounted on steel plates. Dies can be replaced or adjusted by removing the feed rolls at the front of the press. Each of the 5-stations in the die is a working station.

Five operations are performed as the steel strip feeds through the multi-stage die: (1) Notching and piercing, (2) drawing, (3) piercing of the center hole, (4) flanging of the center hole and (5) trimming of the outside.

During the final trimming operation, the stamping slides through an opening in the press



STEEL STRIP passes through five progressive stages, right to left, in making torus rings for torque converters in 350-ton press. Stamping then goes to another press for final trim.

into a tote box. A 150-ton mechanical upright press is used for final trim of the outside and inside of the formed part. The final operation, coining on a 1000-ton hydraulic upright press, completes the press cycle of operations.

Parts are then taken by conveyor to the next operation where fins are welded in place.

Henry and Wright presses designed especially for high production have the entire mechanism, including the flywheel, clutch, crankshaft, connection and lower crosshead located below the die bed. This arrangement permits high operating speeds with minimum vibration. The pulling stroke is applied to the punch or upper die.

An air-operated, multiple disc clutch is mounted on the flywheel and is controlled from an electric push button panel. If the air pressure should fail, the clutch is released and the brake is applied automatically. Air pressure is adjustable to suit the work being produced.

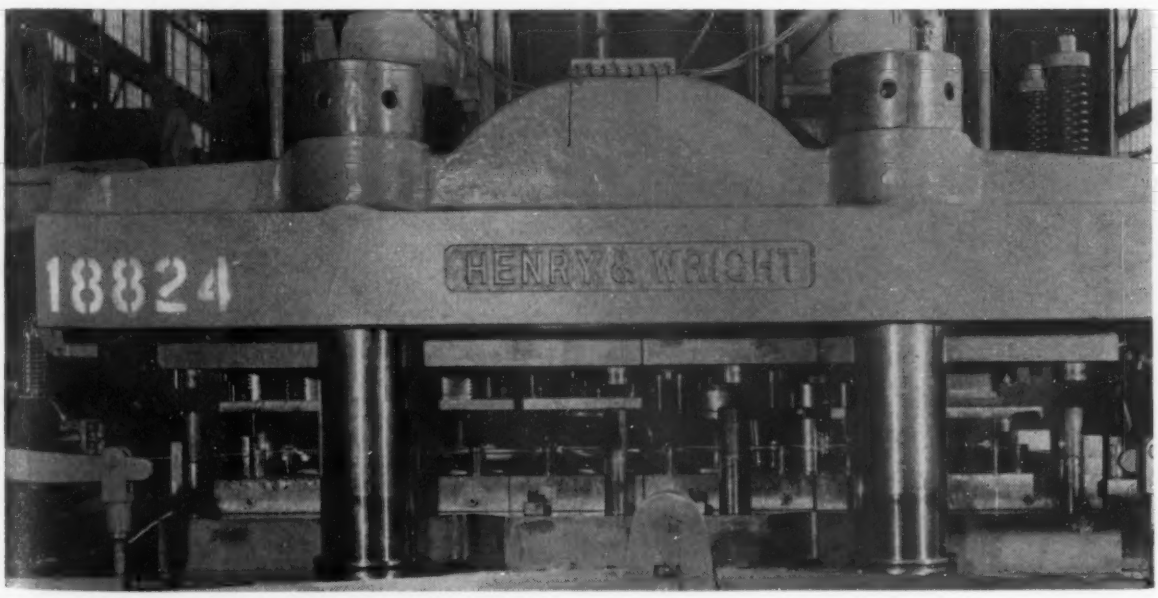
Control buttons provide inching, single stroke non-repeat and continuous operation with stopping at the top of the stroke. There is also an emergency stop button. Plugs also check in advance of stations 2, 3, 4 and 5 to make sure the previous necessary operation has been performed.

Variable speed drive permits operation of the press at the speed best suited to the application.

Strips are held on both sides by a series of notched pins. Following the operation, these pins are raised, freeing the partially formed strip from the die and permitting forward movement of the strip.

A Rowe automatic coil steel feeding device is employed by Chrysler in conjunction with the Henry and Wright press. Coils can be quickly inserted by removing the side panel of the feeder machine. Seven sets of rolls straighten the steel as it is fed by a start-stop motion which is synchronized with the press requirements.

Any minor variation between the press requirements for steel and the amount of coil stock fed from the feeder machine is taken up



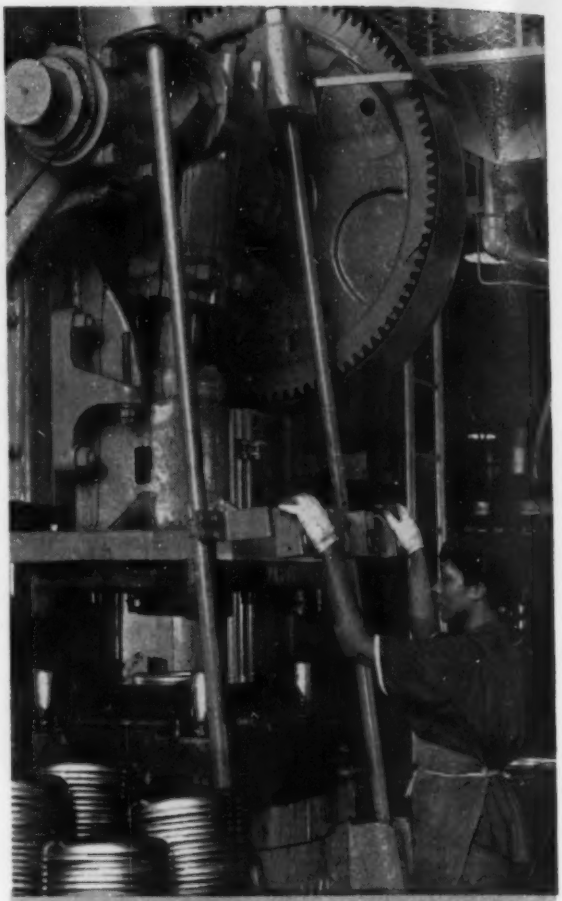
PROGRESSIVE DIES for stamping torus rings are made of air-hardened tool steel. Tolerances are close. Three-section upper and lower dies are mounted rigidly on steel plates.

by the tension-free loop that is held continuously between the feeder and the press. A small arm at the front of the feeder machine maintains constant contact with the steel. If this contact should be lost—indicating an important change in the necessary feeder loop—the feeder and press stop automatically.

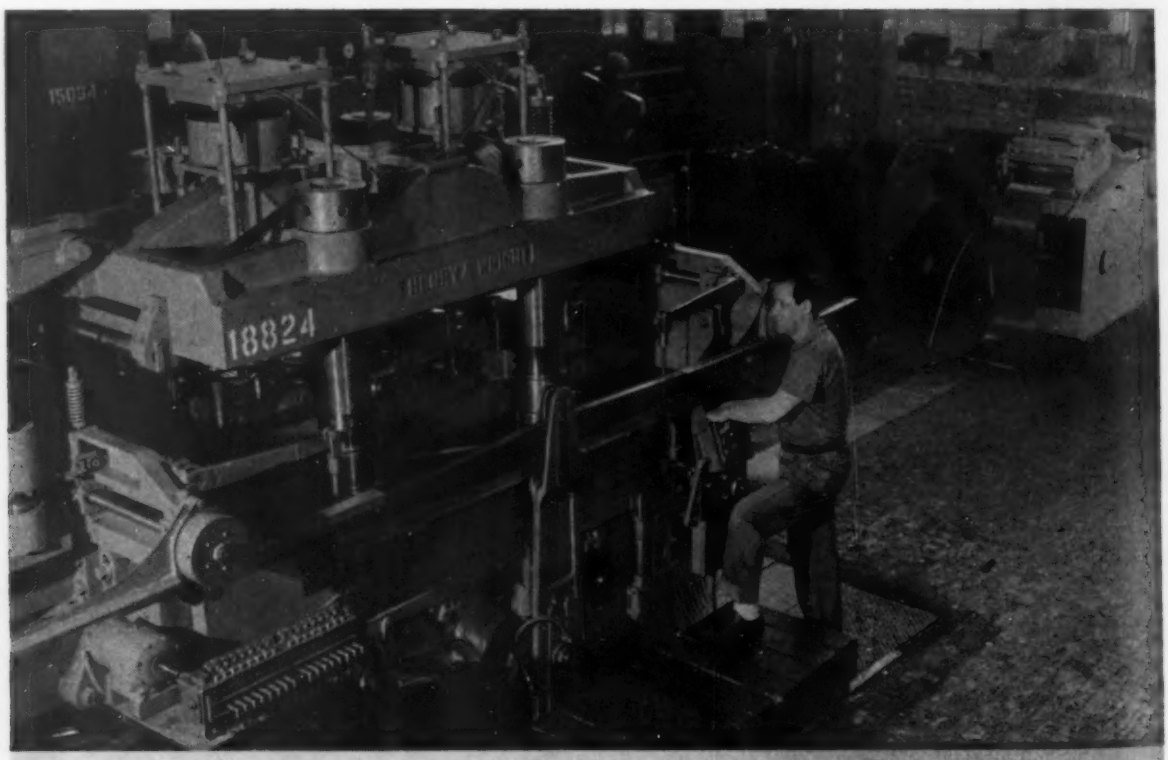
Operating experience by Chrysler during the past year indicates that a high volume of precision stampings can be maintained with this press equipment and tooling.

PROGRESSIVE DIE SETUP BENEFITS

1. Provides maximum production per sq ft of floor space.
2. Eliminates all or most manual handling.
3. Assures effective safety precautions, both for the operator and the press equipment.
4. Offers maximum area of guiding surface, assuring precision alignment.
5. Permits unobstructed view of tools from all sides.
6. Low center of gravity permits high press speeds with minimum vibration.
7. Minimum setup time is required to change dies, adjust roll feeds or change stacking chutes or adjust conveyors.



FINAL TRIMMING in 150-ton upright and coining in 1000-ton hydraulic completes press cycle. In next operation, fins are welded in place.



ENTIRE MECHANISM of this five-station press, including flywheel, clutch, crankshaft and lower crosshead, is below die bed. With this setup, minimum vibration occurs at high speeds.

Automatics Can Show Profits on Short Runs

By Dale Stoneman
Tool Engineer
Warner & Swasey Co.
Cleveland, Ohio

◆ Short production runs on diversified small parts are tricky from a cost point of view . . . Profits on close-bid jobs often depend on the skill of machine operators . . . New automatic machines featuring speed, accuracy, low setup time, help insure profitable small lot production, eliminate factor of "human uncertainty."

◆ Key to use of automatics for 100 to 5000 pieces is low setup time . . . New control devices cut this to a minimum, also put machining cycles on a "pushbutton" basis for unskilled help . . . Case histories show that switch from manual to automatic equipment frequently pays off.

◆ CAN SMALL LOTS be machined profitably on automatic equipment? The answer is definitely yes, in a surprising number of cases.

Let's take a typical job shop, a small business whose existence depends on its ability to produce a variety of short run parts at low cost to its customers and profit to itself. The shop owner's bids must be competitive. And the prices he asks must include his best estimate of the work certain machine operators can turn out in an average day.

But operators get sick, or hurt. Sometimes they just don't show up for work and a slower, less experienced man must be put on the job. So the bid is probably "cushioned" to allow for what we'll call the "factor of human uncertainty." If the cushion is too big the shop might lose the order; if it's too small they might lose money on the job.

After sweating over tough bids like these the shop owner couldn't be blamed for envying the big production plant down the street. They don't have to worry about short runs. They can afford all the advantages of automatics: Accuracy, productivity, less need for skilled operators. Their long runs naturally justify higher setup and tooling costs.

So knowingly or unknowingly the small job shop handed automatic machine builders a two-part engineering challenge: (1) How to reduce setup time in proportion to machining time on small lot production, and (2) how to keep tooling costs at a minimum.

Builders have come a long way in answering the challenge. New machine designs combine the setup speed and simplicity of a manual turret lathe with the productivity of the automatic. Tooling costs are cut by allowing maximum interchangeability of standard tools.

These new machines, combining practicality and economy with accuracy and speed, are finding a growing use in small lot production. They are profitably turning out work in quantities ranging from 100 to 5000 pieces.

Key to utility of the new machines on small lots is quick setup. One type of single spindle chucking automatic saves setup time with a handy pentagonal control drum equipped with adjustable trip dogs. These dogs control feeds, speeds, cutting stroke lengths and skip indexing. Permanent cams for the pentagon turret and front and rear cross slides make cam changes unnecessary. The operator simply loads the chuck and pushes a button.

Setup time lowered

On a 5-spindle automatic bar and chucking machine, quadrant mechanisms adjust longitudinal and cross slide feed strokes to save hours of setup time. Changing heavy or hard-to-reach cams is eliminated. Feeds are instantly selected by a convenient lever shift on the machine's front panel.

Net results of these developments in automatics for short run production:

1. Setup time substantially reduced.
2. Internal mechanisms insure fast, accurate production.
3. Skilled operators are not required.

These are the facts the small shop owner can now use in making his competitive bids. Guesswork and a cushion for the "human factor of uncertainty" are eliminated.

How do these new automatics actually work

out on short runs? Here are some case histories.

Lamson & Sessions Co., Cleveland, makes a variety of bolts on cold-heading machines. The company's tool room makes the steel heading dies and other necessary parts in lots of 12 to 5000 pieces. Competition prompted a search for ways to cut manufacturing costs. Comparative arithmetic showed that if setup time could be reduced, automatics might offer substantial savings in these small lot operations.

Result was the installation of a multiple spindle automatic. Approximately ½ of the company's die production is now done in one operation on this machine. The same work formerly took 2 or 3 separate operations on hand machines. Savings are estimated at 50 pct.

Over a 12-month period the record on the Lamson & Sessions automatic shows average setup time of 8.22 hours, average running time of 13.34 hours, and average production of 37 pieces per hour. Pieces per lot averaged 817. Speed and feeds were kept on the conservative side to obtain maximum tool life.

The Columbus Production Mfg. Co., Columbus, Ohio, makes mechanical jacks, precision parts for material-handling equipment, and parts and supplies for the armed forces. As their business became more competitive, they faced a 3-way problem of floor space, quality control, and shortage of skilled operators.

Automatics seemed to be the answer if setup time on small lots could be held down. Management decided to install two single spindle automatics, and two multiple spindle machines. Work flow, setup changes and sequence of operations were arranged to provide steady operation with minimum setup time.

Biggest savings from the installation are showing up in lots of from 700 to 2000 pieces.

Scrap losses, particularly on threaded parts, formerly ran about 10 pct. These have been cut to less than 1 pct because of positive thread lead control features in the machine.

The speed and accuracy of the automatics has also allowed the firm to call a number of subcontract operations back to their own plant. One item now shows a cost of 21¢ compared to a subcontract cost of 35¢.

A 5:1 cost savings and 7:1 production increase was shown on a landing gear strut bearing made in lots of 600 to 950 pieces. In another case a base container had been machined on hand turret lathes in lots of 1000. Production was 15 pieces per hour per machine with setup time of 4 hours. When the part was shifted to two single spindle chucking automatics, each machine produced 23 pieces per hour. Setup time was cut to 5 hours for both machines.

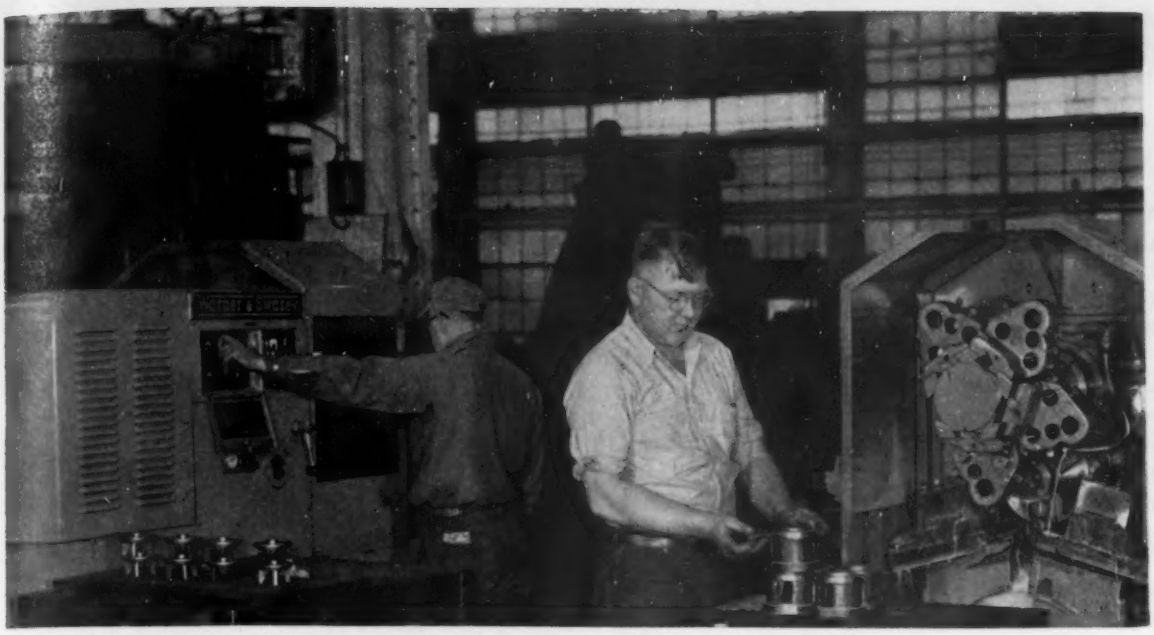
Replaced with automatics

The Gardner-Denver Co., of Quincy, Ill., makes pumping equipment, mining equipment and air compressors. Expanded plant facilities required replacement of antiquated multiple and single spindle automatics plus additional hand turret lathe capacity. To handle a variety of close tolerance turning in lots of 160 to 3500 pieces, the firm bought three multiple spindle automatics and two single spindle chucking automatics.

Production increases with the new equipment averaged 10:1 across the board, with setup time approximately 20 pct less than the old automatics. Surprisingly, the five new machines not

SPLINE COUPLINGS in small lots are profitably made on a single spindle chucking automatic.

CHECKING A PART switched to a 5-spindle automatic for faster production at lower cost.



GUIDE VALVES: 2.47 min each on the automatic (left); on a hand turret lathe: 11.69 min.

only took over the work of the eight old automatics but also of five hand operated lathes.

The company installed a production control system to get maximum results from the new machines. Sales Department forecasts were translated into quarterly production requirements, assuring an orderly flow of work to the automatics with minimum change-over time.

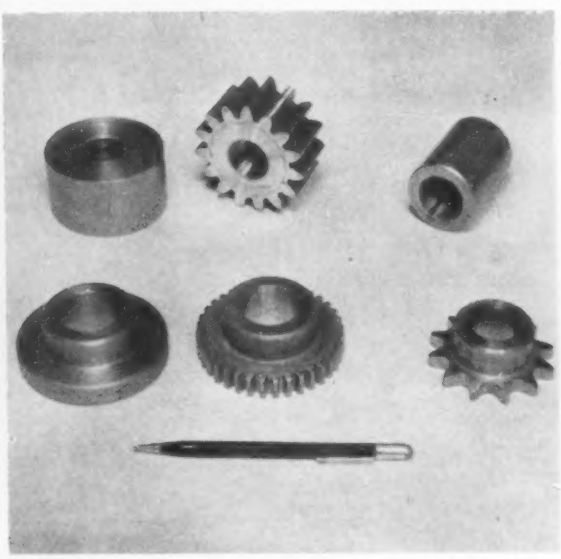
A brass unloader body, made in lots of 250 to 1000 pieces is a good example of savings resulting from the new Gardner-Denver installation. Previous machining time on the old automatics was 2.97 minutes per piece with approximately an 8-hour setup. Current production rate on a new 5-spindle is .74 minutes per piece with a 6-hour setup.

A wing guide valve, machined from hard steel castings in lots of 300 to 1000 pieces, previously required 11.69 minutes per piece on the hand turret lathe. Setup time was 1¼ to 1½ hours. The part is now turned out in 2.47 minutes on a single spindle chucking automatic with no increase in setup time. Consistent production accuracy and less scrap mean added savings for this operation.

The Farris Engineering Corp., Palisades Park, N. J., manufactures small boiler safety valves of bronze for industrial use. Business volume grew to exceed the firm's hand turret capacity, making major subcontracting a necessity. Meanwhile competition reached the point where the company began losing money on certain valves.

An installation of single spindle automatics

OPERATOR LOADS part in air chuck of one automatic while the second machine is cutting.



SMALL LOTS of gears, couplings, made faster, cheaper on single spindle chucking automatics.

was decided upon. This required no additional plant space, but did eliminate costly subcontracting, and assured performance to required tolerances despite a lack of experienced operators.

The first two automatics installed showed an average production increase of 3:1 over hand operated machines. In some cases the increase ran 6:1. The shop superintendent estimated that one man operating the two new machines was equal to six skilled operators on hand turret lathes.

The company also found that automatics could be used profitably on smaller lots than they had thought practical, as few as 20 pieces in some cases.

By cascading production on small lots of similar parts, setup time was cut equal to, and sometimes below that of turret lathes.

By switching to automatics the company was able to reduce prices on their line of bronze safety valves and hold business they might have lost.

The Stallman Gear Mfg. Co., Columbus, Ohio, offers an excellent example of profitable use of automatics in a small plant. The firm employs about 20 men on a one-shift basis.

One of its major problems had been the "factor of human uncertainty." Machines would often be idle because operators did not show up for work. Only logical answer seemed to be automatic equipment which could be set up and kept in operation even if skilled operators were absent.

But lot sizes averaged from 200 to 800 pieces, and for that reason automatic equipment was at first considered out of the question. Further investigation showed that setup time on a single spindle chucking automatic would be less than conventional single spindle automatics, and that the expected increase in production would also justify the installation.

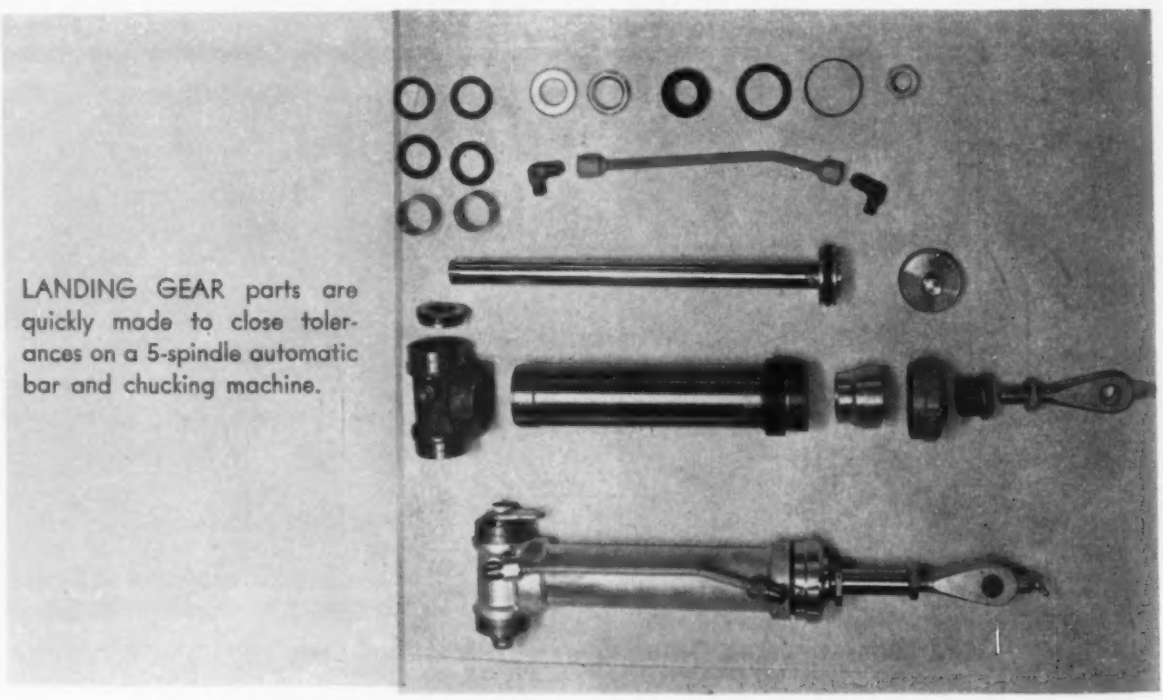
The immediate results obtained are significant. The company reported a production increase of approximately 2:1, with setup time averaging only 15 pct to 20 pct longer than on their hand machines.

They also found that tolerances could be more rigidly held on the automatic than on the hand operated machines. The new machine eliminated human error factors caused by fatigue, lack of experience, etc.

Hold tolerances better

A specific example of savings effected at the Stallman plant is a sprocket made from B-1112 steel in lots of 800 pieces. Thirteen pieces per hour had been made on the hand operated machines. Average rate on the new automatic is 26 pieces per hour, about a 2:1 increase.

Another example is a 36-tooth, 12-pitch gear blank machined from 1117 steel in lots of 400 pieces. The hand turret lathe machined the piece complete from bar stock and cut off at the rate of 10 pieces per hour. Grinding was then necessary on the cutoff face. This part was also transferred to single spindle chucking automatics. Bar stock was cutoff into slugs and despite two chuckings the production rate increased to 24 pieces per hour. The grinding operation was eliminated completely.



LANDING GEAR parts are quickly made to close tolerances on a 5-spindle automatic bar and chucking machine.

Cutting Fluids: Proper Selection Leads to Better Machining

♦ With many new hard and tough alloys, cutting fluids are playing an increasingly important role in reducing friction, improving work quality, saving wear on tools, preventing rust and dissipating heat . . . Present trend is toward use of water-soluble compounds, but straight cutting oils are still preferred at cutting speeds below 35 sfpm.

♦ Multiple-tool high-speed production machining has led the trend to the water-soluble compounds . . . Their effectiveness as coolants for such applications is much greater than that of cutting oils . . . New chemical additives for water are used for grinding to prevent rusting . . . Filtration of cutting fluids improves work quality and reduces tool wear.

By James McElgin
Manager
Metal Working Dept.
E. F. Houghton & Co.
Philadelphia

♦ MACHINING of hard, tough alloys has placed greater emphasis on proper selection of a cutting fluid. This is becoming increasingly important with machines using multiple-tool setups which remove stock at high speeds. By proper selection of a cutting fluid, friction is reduced between tool and chip, tools last longer, work quality improves, power requirements are lower, rusting is prevented and work dimensions are maintained more accurately.

Two classes of cutting fluids are now in general use. One class includes the straight cutting oils which are supplied either in ready-to-use form or in concentrated base form to be diluted with a blending oil by the user. The second class includes the water-soluble or emulsion-type bases to which water is added in propertions determined by the severity or type of machining to be done.

Friction at the chip-tool interface is not reduced by simple lubrication. Any reduction is the result of chemical actions. The surface of the chip in contact with the tool represents a fresh cut, and is clean and ready for any type of chemical reaction.

If a cutting fluid is to effectively reduce the coefficient of friction, it must contain sulphur, chlorine, phosphorus, some type of soap or polar active fatty acids. These compounds react with the chip to form metallic solid lubricants,

Why the Trend to Heavy-Duty Cutting Bases?

High wetting-out properties assure effective flow of coolant to the chip-tool interface.

High sulfur content and polar-type fat additions produce a solid antiweld lubricant between tool and chip.

Lower coefficient of friction between chip and tool is only slightly inferior to that of highly fortified cutting oils at low speeds. At speeds higher than 60 sfpm, the lower coefficient of friction gives results equal to those of straight oils.

Antiseptic properties discourage bacteria growth and prevent rancidity.

Superior rust protection.

or metal soaps in the case of fatty acids. Therefore, in place of metal-to-metal contact, the chip and tool are separated by a thin film of of a solid metallic lubricant or metallic soap film.

The cutting fluid also serves to control the temperature of the entire machine tool. It not only dissipates heat generated at the tool point by stock removal action at high speed, but also prevents heat from being carried back into spindles and bearings and into the carrier itself. By controlling the temperature, work can be held to close tolerances without dimensional changes occurring during heating and cooling.

Good machining is a three-cornered relationship—machines, tools and coolants. Without the latter, the first two could not function properly. In the modern automatic, 10 to 20 different types of tools are required to remove stock simultaneously at high speeds. In addition to heat produced by these operations, frictional heat is created by spindles, bearings, carriers and tool slides, all moving at high speeds. Thus, the job of cooling is equally as important as that of lubricating.

Tougher alloys pose problem

Another important factor is the type of metals to be machined. These are getting tougher and less easily machined. The newer alloys were developed to meet rigid service requirements. Their degree of machinability was not a factor in the choice of such alloys. An example of this trend toward harder, tougher metals are the Nimonic alloys which contain about 75 pct Ni.

Carbon tetrachloride was believed to be best cutting fluid for such alloys, or as an addition to the oil. But, carbon tetrachloride was too toxic, ruined packings, and was prohibited by factory regulations. It therefore became necessary to develop a heavy-duty oil which would handle the job. This has been accomplished, using an oil with a 10-pct fat content, and high in sulfur and chlorine.

Titanium alloys also presented a problem of machinability, as did the newer jet-engine alloys, and many of the stainless steels. It is in the machining of these tough metals that the oil supplier is faced with new problems. To specify a different oil for each metal is undesirable. The ability of a cutting fluid to handle many types of machining and thus reduce inventories and simplify installation is an important point.

The ideal cutting oil for any machining operation on steel consists of a proper balance between active sulfur, active chlorine, fat and mineral oil of the correct viscosity for the particular operation. Except for the possibility of staining, chlorinated oils for heavy-duty work have given outstanding results. Sulfur and its compounds are added because of their effectiveness at high cutting speeds or under severe cutting conditions. Chlorinated oils are very effective for slow speeds and lighter cuts.

Sulfur monochloride has a relatively high chlorine content but tends to liberate free hydrochloric acid which may cause objectionable stains or corrosion. Chlorinated fats, waxes and other organic compounds are considered best for introducing chlorine into a cutting oil. These materials are very stable under high tool pressure and high heat. They do not release chlorine spontaneously, and rusting and corrosion are encountered rarely.

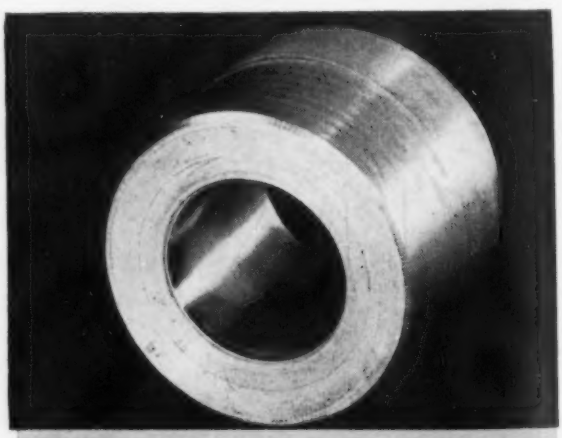
The new water soluble oils

In recent years, a new type water-soluble "oil" has been introduced. Actually, it is not an oil-type base, but a chemically conceived heavy-duty concentrate with properties similar to those of the oil-base cutting fluids. The difference is in the water miscibility of the base.

Water is an excellent coolant, but it rusts freshly machined surfaces. It costs almost nothing, compared to blending oil, making these newer bases more economical.

Mixtures of oil and water have been used for a long time for machining. However, these were conventional emulsified oils which were not saponifiable and did not contain sulfur and other additives for broader use in heavy-duty machining.

Dilute emulsions of soluble oils were usually deficient in wetting-out characteristics which aid the cutting fluid to penetrate to the tool's working area. Also, mineral oil, a major non-



FINE FINISH on medium-carbon steel was produced by high-speed automatic screw machine using a water-soluble cutting oil. The surface finish is good enough to require no grinding.

aqueous ingredient of the emulsion, has little or no effect in forming a solid antiweld lubricant at the chip-tool interface. Emulsions of such soluble oils are effective only for light or medium-duty machining.

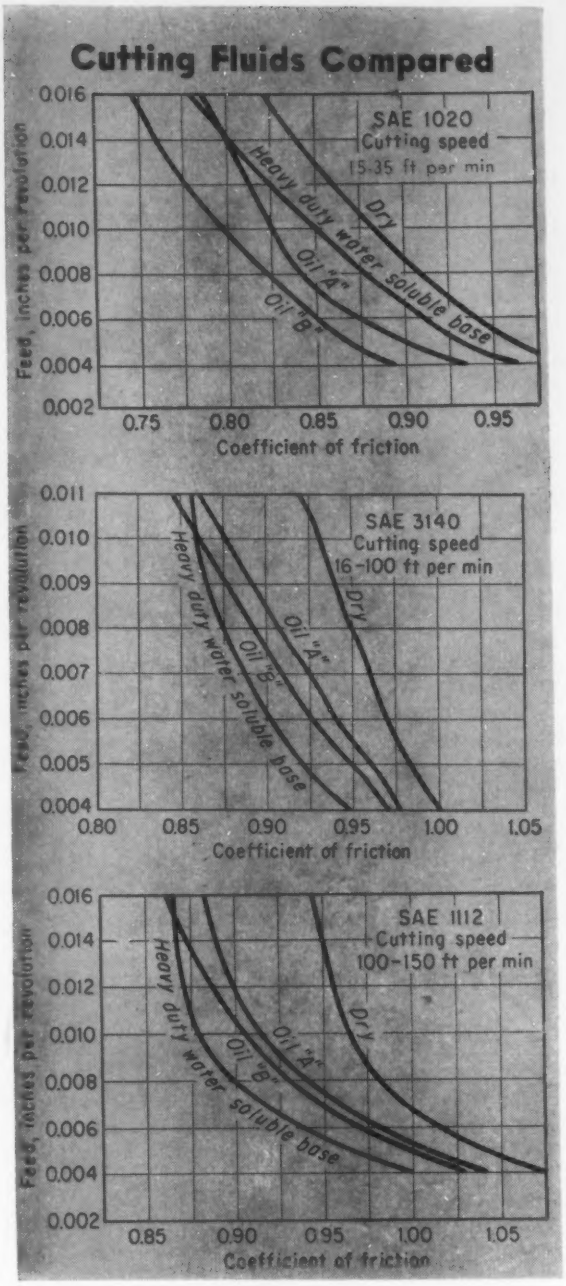
A heavy-duty water-soluble base possesses the film strength characteristics of a heavy-duty, highly fortified straight cutting oil. A 1:15 emulsion will carry a 4,500-lb load on the Faville-Levalley film-strength tester with only 45 lb torque. With the use of these water-soluble concentrates, tool life is excellent, finish good, higher speeds possible, cleaning easy.

The new fortified water-soluble bases can be used for as much as 90 pct of all machining jobs. This big advantage simplifies the selection of cutting fluids. Changes in alloys and machine design are made rapidly, making a specific recommendation of a cutting fluid obsolete within a very short time.

An attempt to recommend a cutting fluid for each job would result in the use of a variety of coolants, a large inventory, and the possibility of error. A compromise is necessary to handle more jobs—a cutting fluid which is satisfactory for tough jobs, yet not too expensive for light-duty machining.

At cutting speeds below 35 sfpm, straight oils have a lower coefficient of friction than a solution of heavy-duty water-soluble base, indicating superior machining results. At speeds from 35 to 60 sfpm, the water-emulsion type fluid acquires superiority. Above 60 sfpm, superior results are obtained from a heavy-duty base miscible with water. Water dilution gives the fluid greater cooling capacity.

New coolants for grinding are essentially chemical additives for water to build up rust resistance. They provide no film strength nor oiliness. However, they do not load up grinding wheels as some fortified water-soluble oils may do. There is a definite place for such chemical compounds in grinding operations.



COEFFICIENT OF FRICTION between chip and tool at cutting speeds of 15 to 35 sfpm is lowest using a fortified mineral oil (B). At 60 to 100 sfpm, water-soluble base improves and is definitely better at speeds above 100 sfpm.

Remove heat from cutting oils

Three-shift operation, plus the heat absorption by cutting oil from heavier cuts, has brought about a need for special devices to remove that heat from the cutting oil. Among the devices are evaporator coils and mechanical refrigeration systems. Heat removal is usually a problem on specific machines rather than on a central system.

Heat exchangers are easy to install and simple to control but are more costly than water-cooling coils or tower sprays. Coolers can be moved from one machine to another when necessary.

Refrigeration is more essential with straight oils than with water emulsions, particularly if enough emulsion is used to flood the work. Emulsions seldom run much above room temperature. The specific heat of oil is 0.48 whereas that of water is 1.0. If oil absorbs the same amount of heat as the water solution, oil temperature would rise twice as high as an equal volume of water solution. With oil, there can be no evaporative loss of heat as there is with water.

Filtration is important for straight oils as well as for water emulsions. Reuse of contaminated cutting fluids has a marked effect on quality. Filtration can be done by several methods. Among them are: (1) magnetic separators to remove metallic contaminants, (2) flotation for soluble oils, (3) centrifuging of oil, and (4) with an endless belt of filter paper.

Lighter, more stable—

New Techniques Expand Uses for Plastic Tooling

◆ GLASS-REINFORCED, thermosetting plastics are supplying a partial answer to the mass production industry's never-ending search for a mterial that can duplicate tooling models accurately, quickly and at lower costs. In addition, the new plastic tools are remarkably stable and impervious to moisture. They are light and easy to handle, yet tough enough to resist accidental damage in servicc.

Some current uses of reinforced plastic tools include:

¶ Die model duplications—male and female plastic duplicates for automoitve die and tool construction purposes.

¶ Checking fixtures—single or multiple duplications constructed to master models or to plastic die model duplications for checking production parts.

¶ Master models—plastic male and female duplications can be made to the wood master model. These duplications coordinate tool work between body, die and production groups.

¶ Tool construction models—special models for constructing and maintaining production tools.

¶ Sample panels—thin plastic panels can be made to die model duplications. These prototype panels may be the same thickness as the steel used in making the parts.

Aid planning and checking

Plastic panels are used by Fisher Body Division, General Motors Corp., in tool planning, tool design and tool tryout. These panels have been extremely useful in planning press and welding operations. They may also be used to precheck materials handling and for other purposes.

A fairly recent development is a reinforced plastic paint-spray shield. While this is still in the tryout stage, plastic shields have shown considerable promise. In addition to reproducing this contoured shape quickly and accurately, these shields are resistant to caustic solutions and mild acids. They are lightweight and relatively indestructible.

Other recent developments in plastic tooling are production assembly tools, drill jigs and hand hammer form blocks. Such tools have been used successfully by the aircraft industry.

Equipment and facilities for making plastic tools are comparatively simple. Techniques can be learned rapidly—a big advantage since there are very few trained workers in this field.

The search for tooling aids which could be made in a short time was started by Fisher Body in 1946. Several departments started an investigation, and a program was set up to provide quick duplication of master models. A small number of spotting models were built using phenolic plastics. These tools were somewhat brittle and unstable. The combination of low tensile strength and other shortcomings eventually limited the use of phenolic plastics to Keller models and temporary spotting models.

In 1951, fibreglas-reinforced plastics were introduced to the automobile industry. This construction gave physical characteristics for tooling applications equaling, and sometimes surpassing, the properties of aluminum. Models could be "layed up" at room temperature and at atmospheric pressure. Use of accelerators made the materials self-curing. Accuracy of the new

Applying new techniques . . .

Mold gets waxed . . .

By W. G. Patton
Asst. Technical Editor

◆ Accurate, highly serviceable plastic checking and locating fixtures can now be made in 24 hr, using new techniques developed for automobile tooling . . . Weight savings of 50 pct or more are possible . . . Their use for new applications is being expanded rapidly.

◆ Special coatings give plastic fixtures hard wear-resistant surfaces . . . Their resistance to damage by handling is an important advantage . . . Many techniques apply both to volume and short run production.

tools was such that epoxy plastic duplications could be used for master models as well as for checking fixtures.

Several advantages have favored the use of glass-reinforced, epoxy plastics. Master models and checking fixtures can be built quickly and accurately, thereby shortening tool and die programs.

Lightweight fixtures and models decrease worker fatigue and reduce shipping and handling costs. Their resistance to wear or accidental damage in service has been satisfactory and their stability has been adequate. Also, overall tooling costs have been reduced. By 1953, all sections of Fisher were using a limited number of fibreglas-reinforced epoxy plastic spotting models, Keller models and checking fixtures.

The best known plastics are the phenolic, epoxy and polyester families. Phenolic and epoxy tooling plastics have practically no shrinkage on curing and aging and are therefore valuable for tools and dies. Polyester plastics are used by the automobile industry mostly for production items. Several of the new plastic materials may be used interchangeably and may even be blended. Where production is low, modern phenolic and epoxy tooling plastics are used successfully for fixtures, tools and drill jigs. These materials can also be used for templates. Epoxy tooling plastics can be cast accurately to contour so that no surface grinding or other finishing operations are needed. They may also be used to build up alternate layers of plastic and glass cloth.

Glass-reinforced plastics save considerably in weight. For example, an aluminum model for an outer door panel weighs 254 lb as compared to 60 lb for a plastic model of the same door panel. Much weight saving in plastic tooling results from the use of special, glass-reinforced plastic tubing in place of metal tubing. Such tubing is strong and rigid.

Special sections greatly simplify the problem of making joints. Epoxy plastic models can be built in a relatively few hours. In machining an aluminum model, it is necessary to provide a wood pattern, make an aluminum casting, rough machine, finish grind and spot the model to final

Applying cloth and plastic . . .

Setting frame to plastic skin . . .

contour. No machining or scraping is necessary in making a plastic model.

Extensive equipment is not necessary for plastic tool construction. With few exceptions, standard wood and metal tool room facilities are adequate. Wood-working machinery, a spray booth, a sanding booth for spraying parting lacquer, hand power tools for cutting and sanding plaster, and a glass cloth cutting table are essential. Other equipment includes machinery for working plastic, granite or cast iron surface plates, wood top tables for cloth trimming and inspection and set-up equipment.

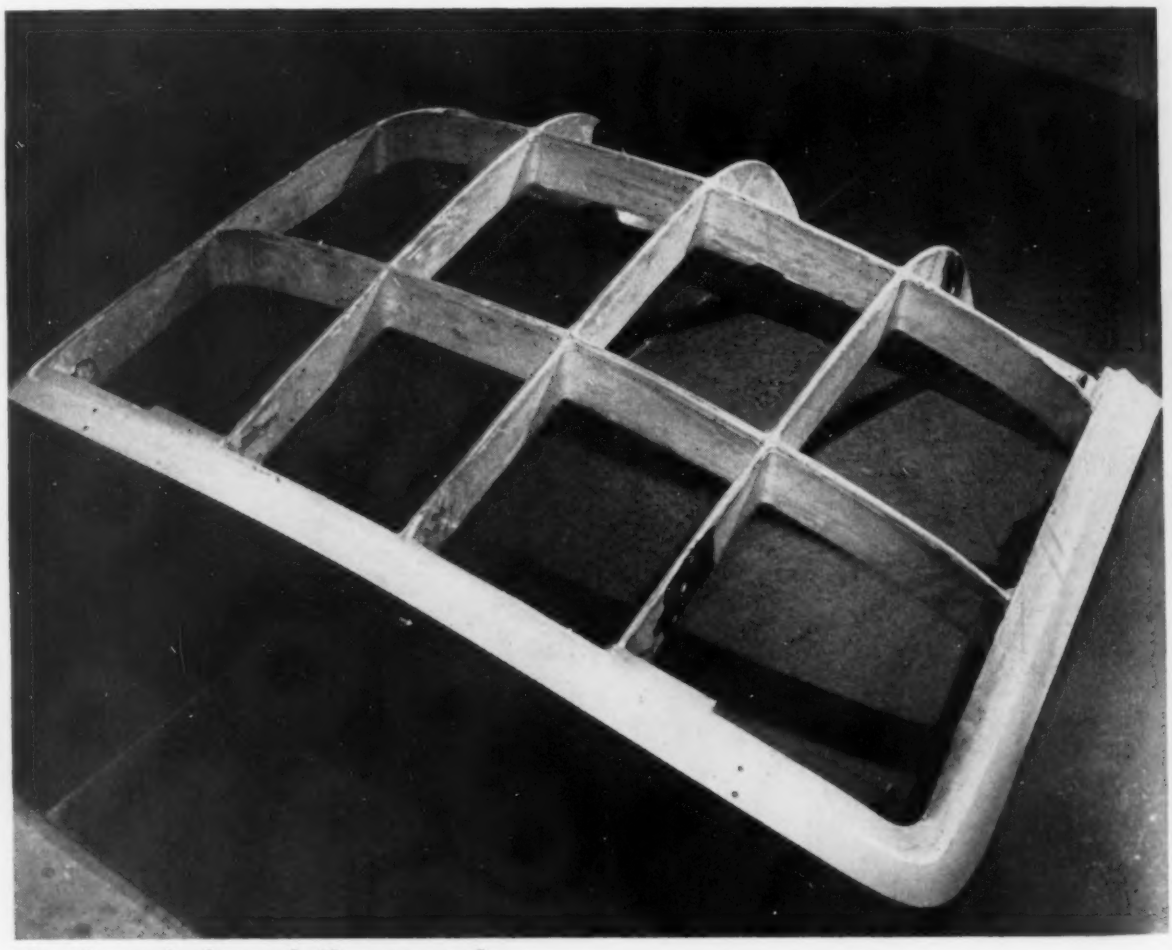
Many of the materials needed can be found in any wood model or pattern shop. Plywood and planks are needed for damming and buildup. In addition modelers clay, masonite, metal thickness wax and parting wax should be stocked. The parting solution is lacquer or poly-vinyl-alcohol, applied in one or two spray coats.

Supplies of epoxy plastic and hardener will depend on the nature and volume of work planned. Several epoxy plastics are available in quart and pint-sized containers. These materials can also be purchased in 5- or 55-gal drums. If larger drums are used, hardener must be carefully measured. Price of the epoxy plastic materials, with hardener, is in the range of $1 to $1.50 per lb.

Other supplies needed include inexpensive 1- and 1½-in. wide flat paint brushes and 1- to 1¾-in. diam fibreglas and epoxy or polyester tubing. The tubing is useful in the construction of lightweight frames for models and checking fixtures.

Miscellaneous supplies include paper cups and tubes for measuring plastics and hardeners, tongue deressors for stirring plastics, fibreglas cloth for laminating, white cotton flock for filler, milled glass fibers to reinforce sharp corners, fibreglas rovings for reinforcement of sharp corners, acetone and alcohol.

Only a limited amount of shop experience is absolutely essential for this type of work. The layup of plastics is a comparatively simple operation. The average inexperienced worker can usually be trained in a week or two. However, some higher skilled workers are required, including tool or model makers, plaster model makers and inspectors. Trained inspectors are needed to check the accuracy of duplications. Because plastic tooling is a relatively new field, workers generally are attracted to it.



Plastic and glass cloth removed . . .

After a model is set up on a surface plate, surfaces are extended or dammed up. After applying several coats of wax, parting lacquer is applied. The correct proportions of plastic and hardener are mixed, and the mix is brushed on the mold surface.

It is good practice to reinforce sharp corners with fiberglass rovings or plastic and milled glass fiber mix. This is permitted to stand until the plastic is soft and tacky but will not stick to the finger. A thick mix of milled glass fibers and plastics is applied where plastic tubes or metal frames are to be attached.

Air pockets are carefully worked out after applying the first layer of fiberglass cloth. This is repeated until the required number of layers of plastic and fiberglass cloth are layed up. The layup should be permitted to stand for 3 to 4 hrs.

After applying the frame, the new tool is permitted to stand for 8 hr. Reference lines can be esatblished directly on the model. After checking, the duplication is removed from the mold.

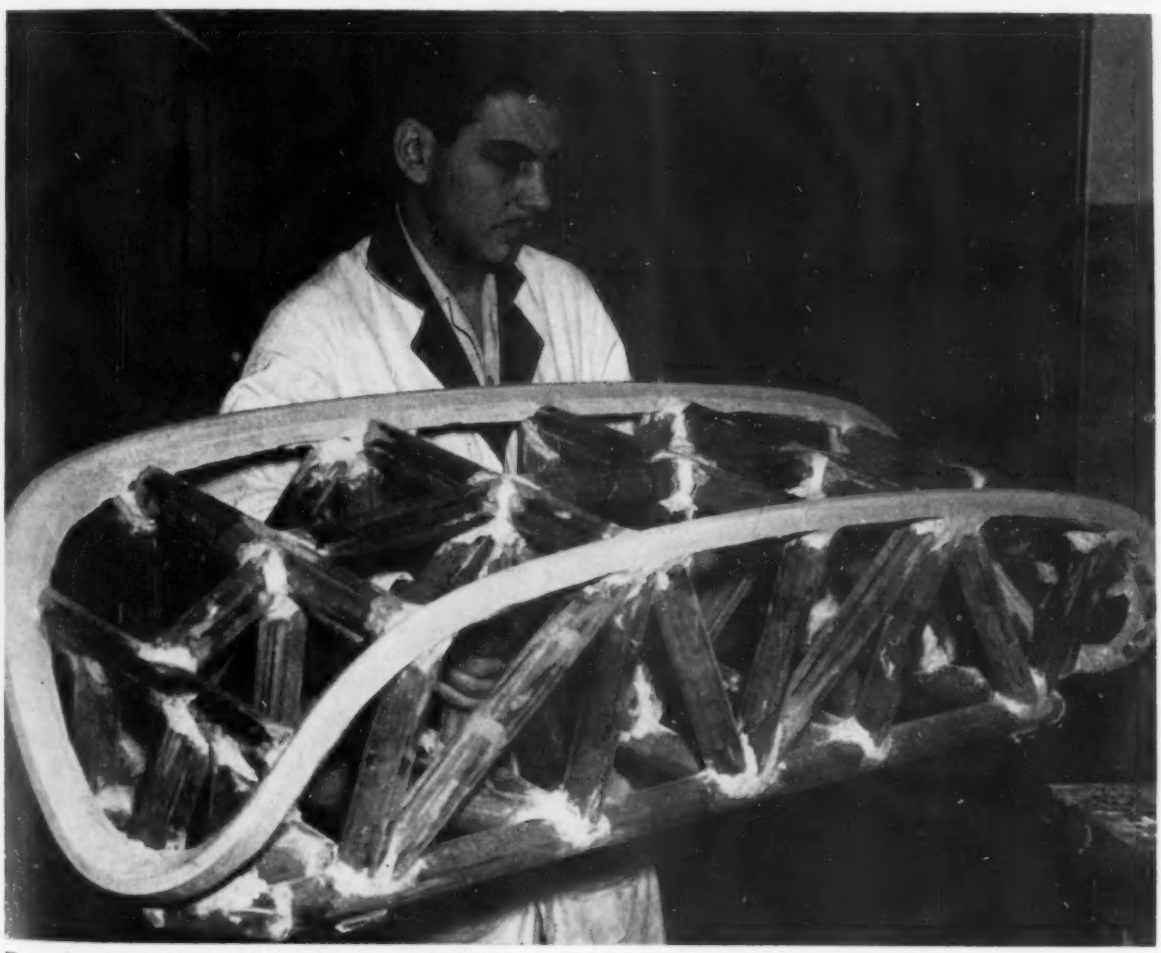
Where wood models have been shellaced or lacquered, some caution should be exercised since heat is generated by the setting plastic. Detailed instruction in the handling of fiberglass and resin and its application should be obtained before using in plastic tools.

TYPES AND USES OF GLASS CLOTH

TYPE	Description
A	General purpose cloth—very flexible, used when laminating extreme contours, untreated with a binder.
B	General purpose cloth—used on simple contours where cloth need not be extremely flexible, treated with a binder.
C	Heavy cloth (0.090 in. thick)—used for thick skin buildups, not too adaptable to extreme contours.
D	Medium thickness cloth (0.030–0.040 in.)—for general purpose applications.

FIBERGLASS LAMINATES

Thickness, in.	Applications	Remarks
0.04	Fixtures or models with solid block backing.	Epoxy type plastic plus 2 layers of fiberglass cloth.
0.10	Plastic master models having reinforced frames.	Epoxy type plastic plus 6 layers of fiberglass cloth.
0.20	Small maintenance models having extreme contour.	Epoxy type plastic plus 12 layers of fiberglass cloth.
0.30	Large maintenance models or checking fixtures where laminate carries part of structural load.	Epoxy type resins plus 8 layers of fiberglass cloth.



Ready for checking window shape . . .

High Speed Machining Improves Quality, Cuts Costs

By R. B. Brooks
Asst. Manufacturing Superintendent
Hyatt Bearings Div.
General Motors Corp.
Harrison, N. J.

◆ **A better product at lower cost sums up results of a recent study of high vs. low speed machining . . . Ring forgings of 52100 spheroidized annealed steel were machined at speeds above 600 sfpm . . . Tool life equalled and in many cases surpassed that obtained machining at 250 to 300 sfpm.**

◆ **Surface finishes are better and dimensional stability is good . . . Rigid machines, ample power and sound tooling are musts . . . Both brazed and mechanically held carbide tools were used . . . One specially developed tool gave outstanding results . . . Uniform hardness and material removal, and careful control of tool regrinding are important.**

◆ HIGH VELOCITY MACHINING can lower production costs and yield better surface finish while maintaining good dimensional stability, a recent study at Hyatt Bearings Div. of General Motors Corp., Harrison, N. J., has shown. Tool life was equal to and in most cases greater than that possible at low velocity machining.

Machining at speeds above 600 sfpm, as compared with low velocity machining at speeds from 250 to 300 sfpm, can be economically sound if the following conditions exist: Rigid machine, ample horsepower, good sound tooling, proper selection of carbides, uniform hardness and material removal, tailored cutting fluid, and proper control and operation of tool regrinding.

In carefully conducted tests designed to evaluate the merits of high vs. low velocity machining an estimated $137.81 was saved in machining 1535 forgings at 650 sfpm compared with costs of machining the same part at 300 sfpm.

Prediction of tool life must be based on as many constants as possible. One important constant is uniform stock removal. To determine uniformity of purchased forgings a check was made on 17 random pieces. These showed a maximum length variation of 0.219 in. and maximum outside diameter variation of 0.040 in. Stock variation and excess material to be removed also affect tool life. Greater depth of cut will increase the amount of heat to be dissipated and increase tangential radial and longitudinal tool pressures causing earlier tool failure. Increased pressures more readily cause pressure welding of chip material to the interface of the cutting tool causing earlier failure of the cutting edge.

Essentially uniform hardness must be maintained to accurately predict, and obtain acceptable tool life. Good machining hardness should be from 185 to 205 Bhn. Forging hardness range was well within these tolerances. Uni-

See: "Bearing Races Machined At High Speed," by R. A. Brooks, The Iron Age, Nov. 6, 1952.

form hardness becomes highly acute when operating in the high velocity range of 600 to 700 sfpm.

Standard production tools used

In the tests at Hyatt, spheroidized annealed 52100 steel ring forgings were used. Machining involved turning the outside diameter, boring the inside diameter, facing both ends and chamfering all edges. Tool life was not considered for chamfer tools since chamfer tool life had never been a problem in cutting with carbide. Two new 16-in. Fay lathes used provided the required rigidity. Tooling was rigid to prevent vibration. Feed for turning, boring and chamfering was 0.0146 ipr. Feed for facing was 0.007 ipr. Cutting fluid was a mixture of 40 parts water, 1 part Lusol.

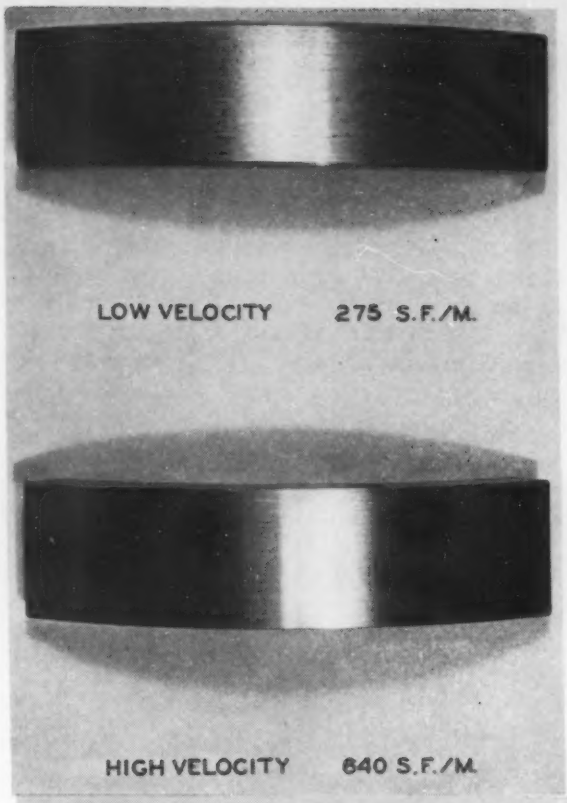
Carbides were used for cutting. Brazed tools were Kennametal's K3H. Mechanically held tools were Kennametal's K5H. Machine cycle was 0.80 minutes per piece per machine. Forty horsepower at the spindle was found ample for the job. A recording watt meter showed approximately 28 hp being used in the worst condition.

Standard production tools were used with the exception of the turning and facing tools. New and used tools were drawn from the tool crib in the same condition an operator would normally receive them. No special grinds were allowed.

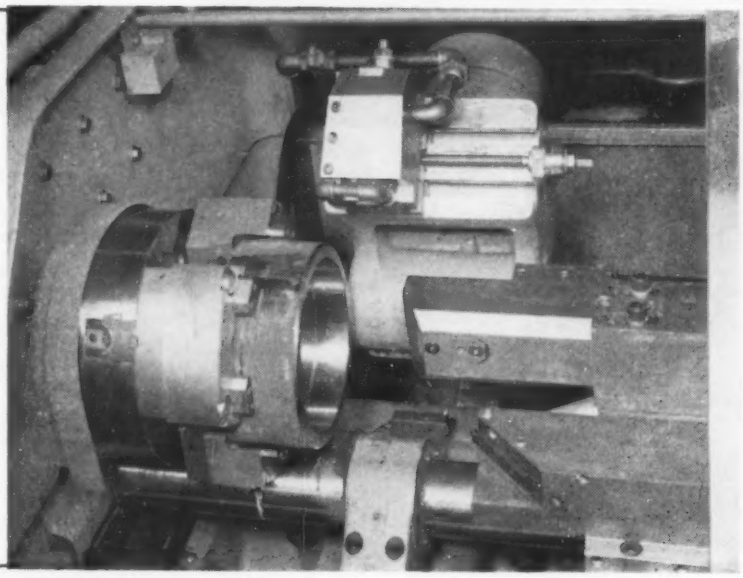
Machined 1535 pieces

Tools were replaced on a basis of edge wear, or failure. Maximum edge wear was set at 0.030 in. In some cases, the operator did allow greater edge wear. Condition of the tool as received accounted for most tool failures.

A total of 42 separate tool setups were made to machine the 1535 pieces using the eight different tools involved in the setup. The number of pieces machined per tool varied considerably. Best results were obtained with sound tools. Less favorable results were obtained with tools with incipient heat cracks, tools with



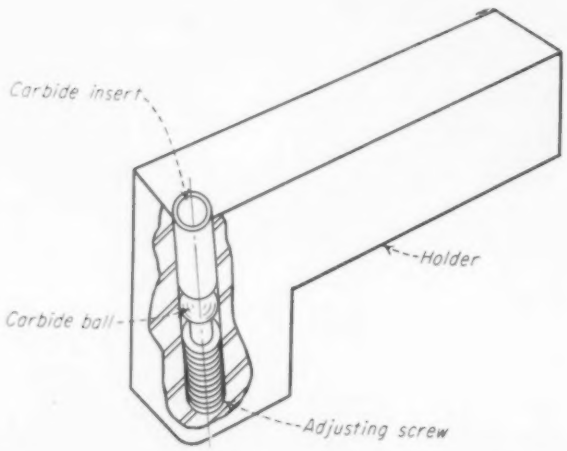
IMPROVED SURFACE FINISH is obtained in high speed machining of 52100 steel of Bhn 200. "High" speeds are those over 600 sfpm.



RIGID SETUP on Fay lathe similar to that used in high vs. low velocity machining studies.

cracks which did not show up until the tool was placed in service.

At high velocity, boring tools can remove approximately 300 cu in. of metal per regrind. At low velocity metal removal will be only 100 cu in. per regrind. Turning tools, because of their freer cutting action, will remove much more metal per regrind than boring tools. High velocity turning, however, will still show a 3 to 1 increase in tool life over low velocity turning.



CARBIDE INSERT of special tool rests on carbide ball. Both ends of the carbide insert are used for cutting before the insert is reground.

SPECIAL TURNING TOOL tried in machining tests removed far more material per regrind. Carbide cutting insert has cylindrical shape.

A special type turning tool used in high velocity machining turned approximately 1500 cu in. of metal, while the regular turning tool at low velocity only cut about 200 cu in. of metal per regrind. The face tool performed essentially the same way but with an inserted type bit extremely high metal removal was possible. Where possible, mechanically held tool bits should be used since a harder grade of carbide may be used due to lack of brazing strains.

High hardness and scale condition in the forging were important factors in lowering tool life. Scale is very hard and resists annealing. The scale, as it strikes against the tool, chips the cutting edge. As the rotating piece is cut, eccentricity caused by wall variation tends to distribute this chipping over a large portion of the cutting edge causing early failure and poor surface finish.

Special holder developed

A special holder used at Hyatt has many advantages. Chief value derived from its use is longer tool life. Rather than clamp the tool bit rigidly, this new holder permits the tool bit to rotate while cutting.

Tool bit changing is rapid and both ends of the round tool are used before regrinding. The holder is hardened and has a ground hole to receive the carbide cylinder. Supporting the tool bit is a carbide ball which reduces the friction of rotation while concentrating cutting forces at point of contact. An adjusting screw permits proper placement of the carbide for center height. Under normal conditions a tool life 4 to 6 times that of the conventional brazed single point tool can be expected.

Excellent dimensional stability may be expected when operating under the conditions outlined. Limit of variation in machining the outside diameter of parts 1 through 45 was held within 0.001 to 0.0015 in.

Surface finish enhanced

From the 45th to the 90th piece outside diameter grew constantly, reaching a maximum of 0.004 in. over the original size setting. Variation was still consistent at 0.001 to 0.0015 in. from piece to piece. Two point out of roundness never exceeded 0.004 in.

Surface finish was greatly enhanced by high velocity machining and quality was maintained throughout the life of the carbide even though the tool had been used to the replacement point. High velocity reduces the problem of built up edge, a main cause of poor surface finish. Pressure welding of chip material to the cutting tool is relative to time.

Better control—

Transfer Machine Automates Crankpin Grinding

◆ Crankpin grinding, one of the toughest cylindrical grinding operations going, has finally been automated with a new transfer type grinding machine . . . In a completely automatic grinding operation crankshafts are loaded in the machine, fed from one grinding station to another, and then unloaded . . . One operator supervises the machine which has eliminated all handling operations.

◆ Crankshafts are indexed partly by the lifting mechanism . . . Final location is obtained by built-in locating devices . . . Wheels are trued automatically at predetermined intervals . . . Automatic compensation for reduction in wheel diameter is made by the feeding mechanism . . . Automatic inspection can be built in.

By H. P. Chace
Chief Sales Engineer
Grinding Machine Div.
Norton Co.
Worcester, Mass.

◆ CRANKPIN GRINDING poses some of the toughest cylindrical grinding operations in the auto industry. Difficulties encountered in grinding crankpin journal diameters have made the crankshaft one of the last major auto engine parts to be automated. Now, with a transfer-type crankpin grinder, even this part can be completely ground automatically. Substantial savings in crankshaft costs have been possible through elimination of many handling operations.

Grinding crankpin journal diameters presents problems not encountered in most cylindrical grinding operations. These are peculiar to the part and require special equipment. A means for holding and driving the part in chucks or workholders, offset by the amount of the throw, is required. Provision must be made for precise angular location to bring the crankpin into exact alignment with the axis of rotation of the driving heads on which the workholders are mounted. The shaft must be driven from both ends without putting a torsional strain in the shaft and both workheads must revolve in exact synchronization.

A typical modern machine set up for conventional crankpin grinding requires the handling, adjusting, controlling and gaging steps outlined in the box. These involve considerable effort on the part of the operator. Most crankpin grinding machines, for example, are arranged to grind all the crankpins on a shaft before removal. This requires manual indexing of the crank in the workholders after each grind except where two crankpins are in line as is usual on six cylinder and straight eight engines. The second pin is then ground before releasing the clamps and indexing the shaft. The work table has to be positioned to locate each crankpin in line with the grinding wheel.

Replaces manual duties

The Norton transfer-type crankpin grinder does two things. First, it incorporates some of the most advanced equipment for accurately grinding crankpins automatically. Second, through mechanization, it can replace all of the manual duties of the operator involved in inserting, clamping, adjusting, controlling,

gaging and removing the crankshaft from the grinder.

All these functions are automatic and continuous. This complete handling and grinding cycle is repeated at each station as the crankshaft proceeds along the line from one grinding station to the next and finally to the conveyor line. Only one operator is needed for a complete transfer line with stations for each of the crankpins to be ground.

Automatic truing of the grinding wheel at predetermined intervals is an important feature of the transfer grinder. Wheels may be trued after one or more grinds to obtain best wheel economy. To compensate for reduced wheel diameter resulting from truing, the feed mechanism automatically advances the wheel the necessary amount.

Inspection can be built in

Automatic inspection of each crankpin, after it is ground and on its way to the next station, is being built into a machine now under construction. A system of lights controlled by the inspecting device will inform the operator when any crankpin diameter approaches the high or low tolerance limit. The operator can then adjust the wheel position to correct the error.

The machine is built in sections. Each base section supports two grinding wheel heads sliding on flat and vee ways and two pairs of work heads driven by a single motor. Each grinding wheel head has its own driving motor and carries a 42-in. diam grinding wheel on a rugged spindle running in sleeve bearings—one bearing on each side of the grinding wheel. One section will grind two pins. For a V-8 or 4-cylinder shaft, two sections will be required; for a 6-cylinder shaft, three sections.

Each grinding station has one pair of workholders with hydraulic clamps mounted on antifriction bearing work spindles. These spindles are synchronously driven for equalization of torque deflection. A positive work stop locates work in exact angular position. Interlocks prevent incorrect positioning of shafts in holders. If shafts are not correctly located angularly, work clamps cannot be locked and wheel slide will not advance.

The wheel slide for each grinding station is provided with an automatic infeed composed of shoulder feed, body feed, sizing feed, dwell and rapid withdrawal, all controlled by an automatic timer. This cycle is interlocked with the work drive controls, coolant and loading functions.

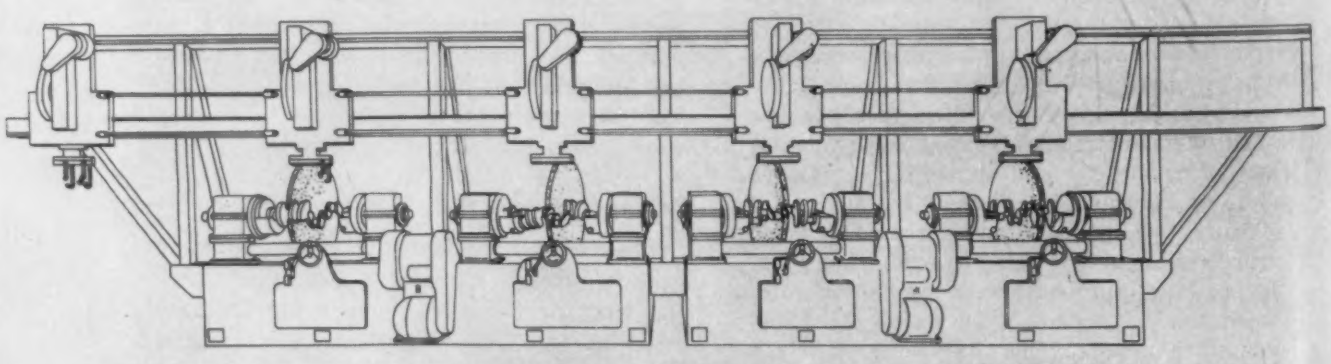
The wheel feed is hydraulically operated. A large diameter feed screw revolving in its nut feeds the wheel for grinding the crankpin body. A steadyrest supports the pin during grinding.

The transfer mechanism consists of an overhead track supported by a fabricated steel framework and extending the whole length of the machine from loading to unloading conveyor stations. Transfer heads move up and down to pick up and deposit the crankshafts from loading station to machine, from grinding station to station and to final conveyor.

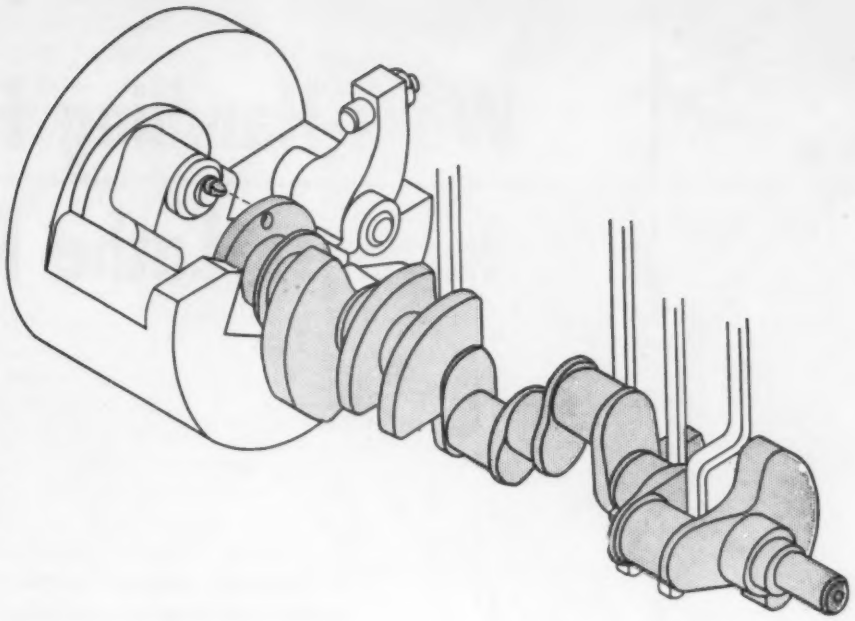
These heads move simultaneously. One picks up a shaft from the loading station while the next lifts a ground shaft from first grinding station. The third lifts a ground shaft from second to third grinding station and so on. When the heads are elevated they all move to the right and then lower their shafts into the several stations. Then, as grinding progresses these transfer heads return to their original positions to pick up shafts again.

Movements of the transfer mechanism are hydraulically operated and electrically controlled with interlocks. This insures proper operating sequence and stops the operation if any section of the transfer or function of the machine fails.

Angular indexing is done roughly by the lifting hooks while transferring the shaft from one station to another. The shaft is accurately



FIVE TRANSFER HEADS are used in grinding 4-cylinder or V-8 shafts. First head, left, moves shafts into machine. Other heads shuttle back and forth carrying crankshafts from station to station. Final head, right, carries the ground crankshafts out of the transfer machine.



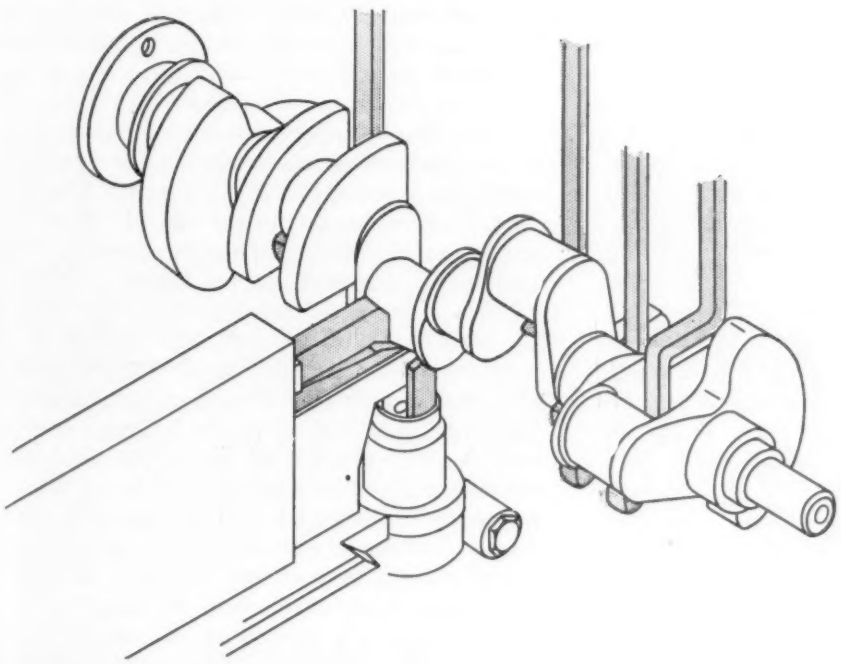
TRANSFER HOLDERS locate shafts in workholders approximately. Tapered plunger enters flange drive hole, assures exact location of part.

indexed by an auxiliary hydraulic unit mounted on the base which causes the shaft to rotate in the holders. Correct angular position is determined by a locating plunger in the left hand work head as it enters the driving hole in the shaft flange.

Longitudinal indexing is accomplished by a mechanism mounted on the steadyrest body and in line with the grinding wheel. As the shaft is deposited in the grinding station, the mechanism engages the side wall of the pin to be ground and aligns it with the grinding wheel.

Crankshafts are fed into the machine from a loading station supplied by a previous operation. The automatic loading mechanism is mounted on a rail above and in line with machine workheads. Production of a complete crankshaft, grinding all crankpin journals and adjacent shoulders is comparable to that of a good operator on a modern conventional crankpin grinder grinding a single crankpin. Also, since the machine is completely automatic, it operates at close to 100 pct efficiency all day.

Provision is made in the control arrangement so that should any one or more stations be temporarily shut down for adjustments or repairs, the other stations can be operated. A standby grinder is used for one operation.



EXACT LATERAL LOCATION brings crankpin directly opposite grinding wheel so that equal amount of stock will be removed from shoulders.

Work-Handling Fixtures Increase Lathe Production

G. M. Class
Vice President, Engineering
Gisholt Machine Co.
Madison, Wis.

◆ Production rates on standard lathe equipment can be raised materially by using more work-handling devices . . . They bring the concept of automation closer to the smaller plant . . . Equipment produces more, waits less.

◆ By absorbing loading and unloading times into the machining cycle, floor-to-floor time is reduced . . . Simplification of parts handling in some cases permits one operator to run several machines . . . Closer tolerances and ability to combine several operations in one area are possible.

◆ WORK-HANDLING fixtures and devices integrated into automatic machining cycles of standard lathe equipment bring general industrial automation one step closer—even for the smaller manufacturer.

Handling aids permit fuller utilization of machine productivity. They allow workpieces to be loaded during operating cycles rather than when machines are standing idle. The equipment produces more, waits less.

Various fixtures and devices can be employed depending on the physical characteristics of the part. Several types now in use fall into the following categories: carriage-mounted indexing turrets; swinging cup-type loading fixtures; loading shuttles and cradles; loading rails on disappearing tailstocks; and rotating loading arbors.

Carriage-mounted indexing turrets reduce floor-to-floor time and increase production by absorbing loading and unloading time into machining cycles. One manufacturer increased production of cast iron electric motor frames on an automatic lathe equipped with a twin arbor arrangement. These arbors are mounted on a hydraulically-operated special indexing turret which provides 180° rotation at the end of each machining cycle. This setup permits loading and unloading operations on one arbor while work is being machined on the other.

Operations are as follows: Machinist puts rough motor frame casting on free arbor on right hand of machine. When machining operations are completed on the arbor in work, the machine automatically indexes the turret spindle 180° to put the rough casting into position for machining, Fig. 1. At the same time, the finished casting is positioned for easy removal from the arbor. Although operation of the machine is automatic, push buttons for indexing, travel, and chucking give operator complete control at all times.

This setup is used for machining three sizes of cast iron motor stator frames. The machine combines high speed turning operations, accuracy of tolerance control and virtual elimination of waiting time between loads. The rabbet fit diameter is machined to within 0.002-in. tolerances. Total floor-to-floor time is 27 sec. A variation of this technique is used by another manufacturer for machining cast iron and steel plug valve bodies. Depending upon the kind of valve body being machined, five or six stations on the machine's hexagon turret are used. The first turret station has a loading arbor to carry the workpiece into proper position for chucking, Fig. 2.

The tapered seat of the plug valve is rough and finish bored with tools mounted on the turret. These are guided by an angular cam

on the cross-slide and held tightly against the cam by sustained air pressure. Other operations include straight boring, facing, and, on some workpieces, grooving cuts.

This setup permits one man to operate two machines with ease. Floor-to-floor time for a 2-in. valve body shown is 11.5 min. All loading and machining operations are part of the machining cycle.

Loading fixtures and carefully planned tooling eliminated an operation in the machining of oil well rock bit assemblies. The addition of a special tail stock tool slide and swinging cup-type loading fixture has simplified operations and increased work output.

The piece is a rock bit assembly used in oil well drilling operations. Because initial alignment is important, the bit, complete with cutters, is loaded into the cup of an air-operated, counter-balanced, swinging loading fixture which holds the drill bit assembly on the center-line of the lathe spindle. An air-operated drawbar then pulls the pot-type chucking fixture against locating stops and the part is ready for machining, Fig. 3.

Loading shuttles cut handling

A number of different sizes of drill bit assemblies are handled on this machine. This single automatic setup completes the job in 2.25 min. Production-wise, the machine is producing at a rate equal to three hand-operated turret lathes.

Loading shuttles and cradles on automatic lathes permit tools to be kept in operation many more hours of the work shift.

Work handling in machining steel shell bodies on automatic turret lathes is simplified by use of a hydraulic loading shuttle, Fig. 4.

An operator can load a rough workpiece onto front cradle of the shuttle while the machine is performing operations on the base end of another 8-in. steel shell body. An air-operated collet chuck holds shell during machining.

Ejector transfers part

When the machining cycle is finished, a hydraulic ejector transfers onto the rear cradle of the shuttle. With the completed workpiece on the shuttle, the shuttle moves longitudinally on the ways to clear the workpiece on the front versely to bring the new workpiece on the front cradle of the shuttle, in line with the spindle centerline. The shuttle moves longitudinally toward the headstock to bring the workpiece toward the collet chuck. A pusher bar mounted on the hexagon turret pushes the new workpiece into the collet for chucking.

The part is then moved to a conveyor running at the back of the machine, while the new workpiece is machined. The shuttle then moves forward. When machining is completed, the piece is once again ejected and the cycle starts over.

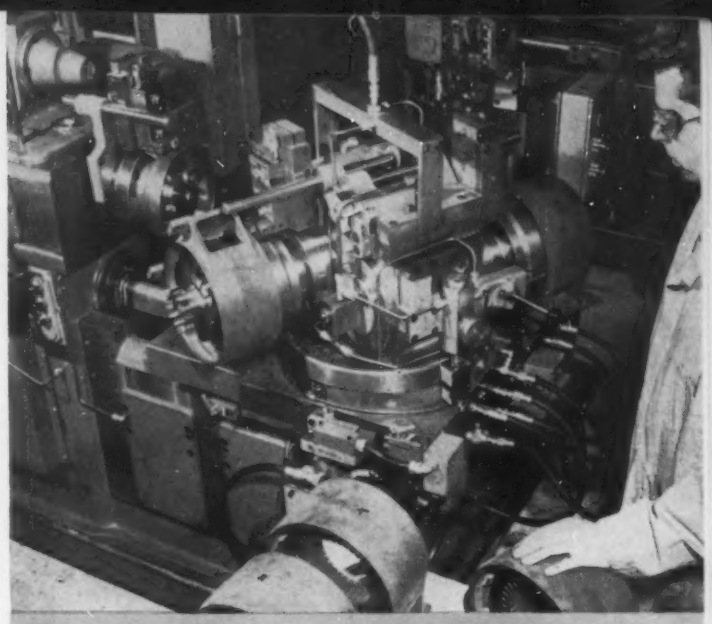


Fig. 1—Carriage-mounted indexing turret permits loading of rough casting on one arbor of machine while another is being machined.

Another machining operation on shell forging uses a loading cradle to simplify handling, see Fig. 5. The job done here is the rough turning of the band groove, the machining of the boattail and the facing of the base. Workpiece is supported in a special steadyrest and held with an air-operated collet chuck.

The steel shell blank is placed by the operator in the rail-mounted loading cradle while the machine is in operation. The operator shoves the shell and cradle forward, the cradle sliding on the two fixed rails. After the workpiece is loaded into the steadyrest and chucked, the cradle is returned to its original position to operate a limit switch which permits the operator to start the machining cycle. Another arrangement calls for power movement of the cradle and automatic ejection of the piece.

Loading rails mounted on a retracting tail-

Fig. 2—Variety of valve bodies are machined on this automatic lathe. First station has loading arbor to carry parts to chucking position.

stock facilitate the handling of large, bulky workpieces. One example is the machining of 4.2-in. steel mortar shell bodies on an automatic lathe equipped with the following: an expanding mandrel; an air-operated tailstock, independent front and rear slides; and two sets of bar-type loading rails, Fig. 6. Rough workpieces are loaded by crane onto the front set of loading rails during machining.

The piece being machined is chucked on the expanding mandrel and supported by a heavy-duty air-operated tailstock. Tools mounted on the front carriage turn the outside diameter, while tools on the left rear independent slide perform the facing and chamfering operations. When machining operations are completed, the tailstock quill retracts and the right rear independent slide moves the tailstock transversely until the rear set of loading rails is directly in line with the mandrel. The completed workpiece is then slid off the mandrel, onto the rails, and then onto a conveyor line.

A rough workpiece, resting on the front set of rails, is then rolled over onto the rear rails and slid onto the expanding mandrel. The rear independent slide then moves forward until the tailstock quill is in a position to support the workpiece. Machine is then ready to recycle.

Tooling on front and rear slides on an automatic lathe, together with an hydraulically-powered loading arbor, cuts nearly 20 pct from the original guaranteed time per part—a bonus of eight parts per hr in the machining of diesel engine cylinder heads.

Carbide tipped tools rough and finish turn the 13⅝-in. outside diameter of these cast-iron

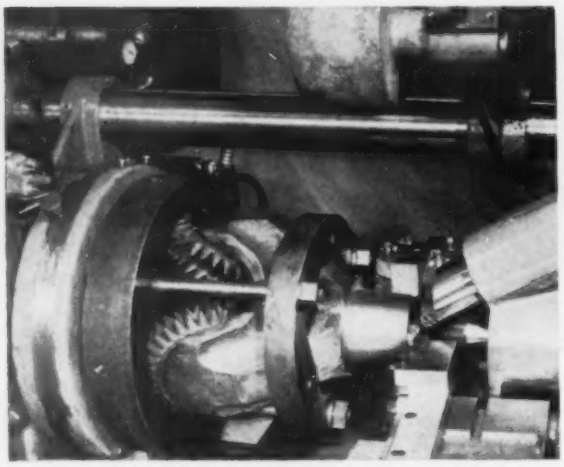


Fig. 3—Swinging loading aligns drill bit assembly with lathe centerline. Pot-type chucking device pulls part against the locating stops.

Fig. 4—Hydraulic shuttle simplifies handling in machining shell bodies. Completed parts are ejected hydraulically onto rear cradle.

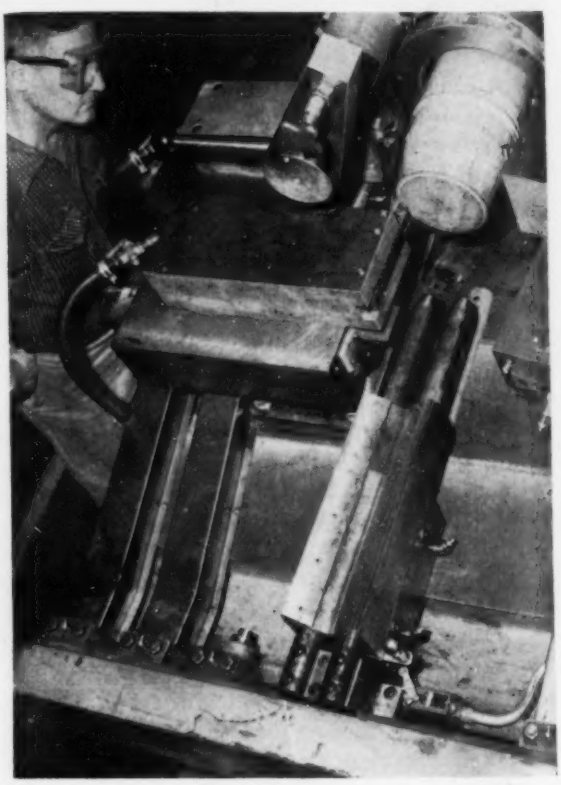


Fig. 5—Handling of steel shell forgings is aided by rail-mounted loading cradle, foreground. Operator manually positions cradle and pieces.

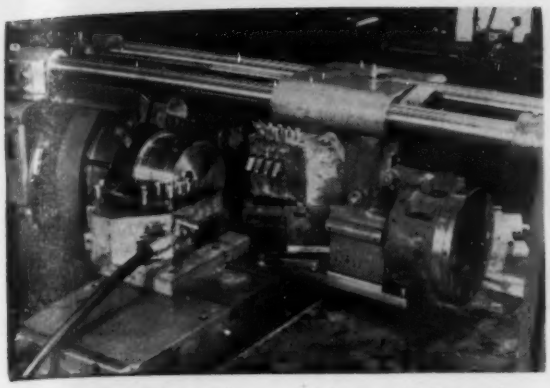


Fig. 7—Swinging arbor used in machining cylinder head castings. Work is loaded on the arbor which can be swung free during machining cycle.

heads as well as both inner and outer faces.

Loading operations on this machine are streamlined by the addition of an hydraulically-operated loading device having two loading stations which are indexed by hand. After a piece is completed, the spindle is stopped and the unloading arbor is moved hydraulically toward the spindle. The air chuck jaws are released, and the arbor and lock carry the workpiece clear of the tools.

The loading fixture is hand indexed and power traversed to bring the new workpiece up to the spindle. The new piece is then clamped in the chuck, and the fixture is again moved away from the tools. After the machine is started, the operator removes the completed piece from the loading arbor and replaces it with a rough casting, ready to be machined.

Reduce machinery time 20 pct

Only 0.2 min are required for loading and unloading operations—the balance of the arbor-loading time being taken while the machine is cutting chips. Total floor-to-floor machining time is 1.5 min, nearly 20 pct below the original estimate of 1.75 min. The piece then goes to another machine, also equipped with a work-handling arbor arrangement, for subsequent operations, see Fig. 7.

A variation of the loading arbor technique of simplifying work handling is the swinging arbor used in the machining of other types of cylinder head castings. In this application, rough workpieces are loaded onto the arbor after it has been swung free of the machine and while machining operations are going on.

At the completion of machining, the open side of the fixture is brought up to the chuck and clamped on the piece being machined. The lathe chuck is released and the finished piece removed by the fixture. The holding fixture, with the rough piece clamped in the opposite side of the fixture, is rotated 180 degrees and returned with the rough piece in position to be chucked, see Fig. 8.

After chucking the rough piece, the fixture

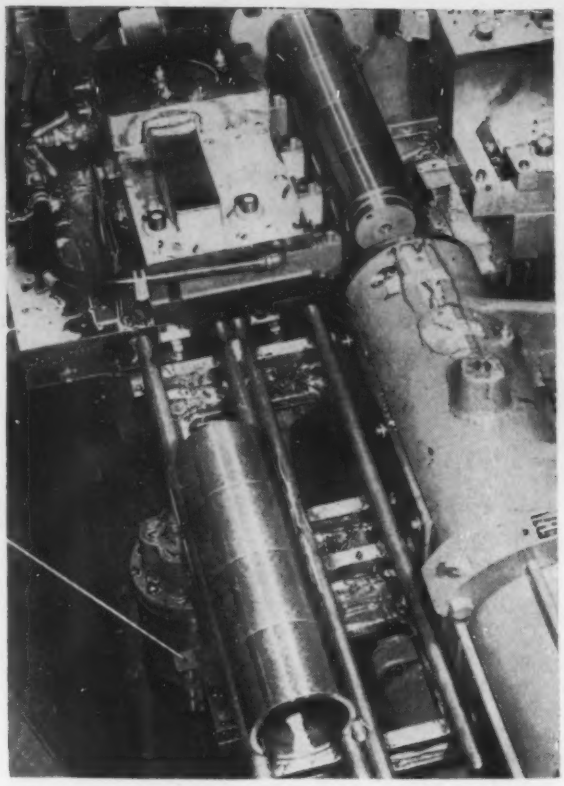


Fig. 6—Loading rails on right rear independent slide (which also mounts tailstock assembly), simplify loading operations on automatic lathe.

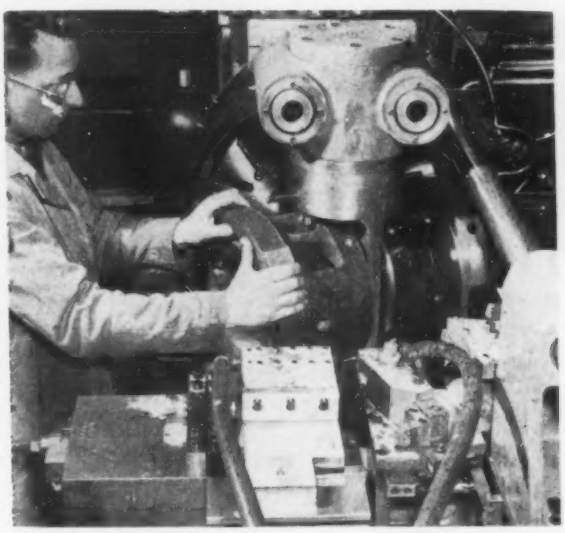


Fig. 8—Operator swings holding fixture 180° to bring new piece into chucking position. Finished part will be replaced with a rough one.

is rotated away from the working area of the lathe and the new machine cycle is started. While the lathe is in operation, the operator removes the finished piece from the fixture and replaces it with a new one. The fixture is then ready for the next loading and unloading cycle.

Floor-to-floor time for the machining cycle without the loading device was 2.75 min, of which 1.50 min were devoted to machining. The fixture permits a net gain of 0.50 min per cycle.

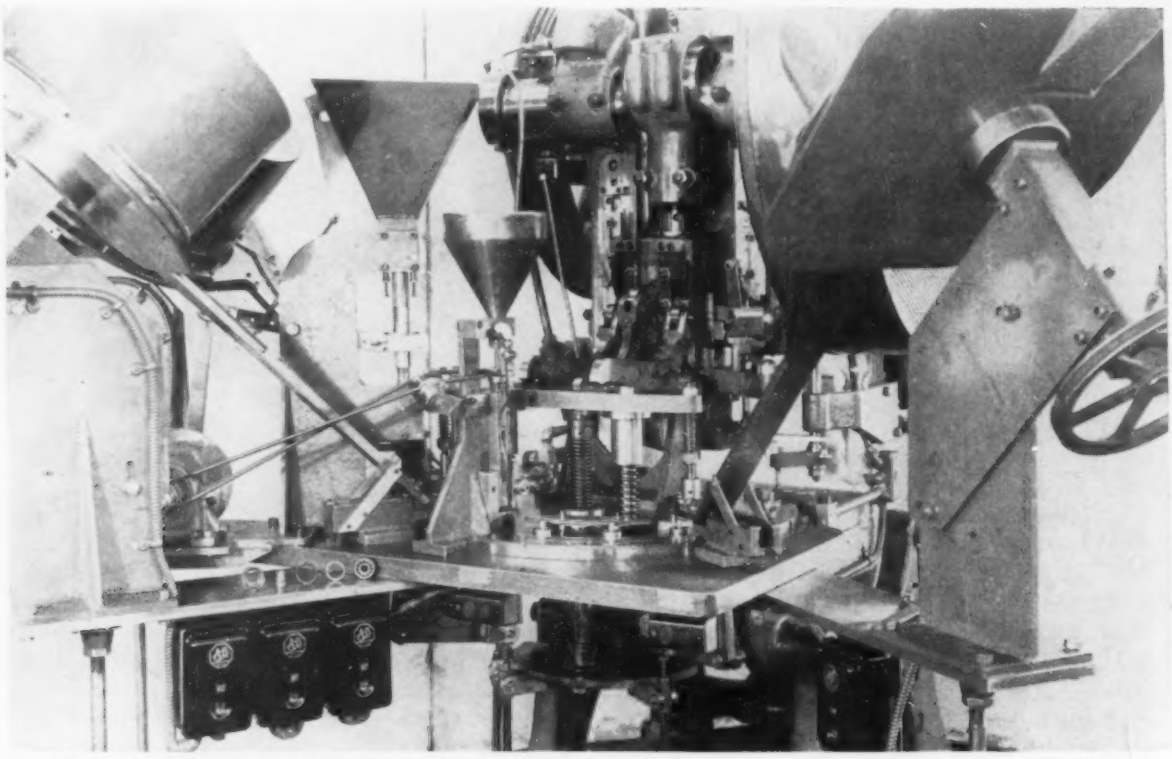
Dial Feeds Increase Press Capacity

By W. W. Schug
General Sales Manager
The V & O Press Co.
Hudson, N. Y.

◆ POWER PRESSES equipped with dial feed provide a practical means of applying ideas of automation to specific machine setups. Press capacity in secondary and assembly operations can be increased, product quality and productivity can be raised and manufacturing costs may be cut.

Primary function of the dial feed is to carry the tool or parts to the punch member of the press. In its simplest form, it enables the press to perform such relatively routine jobs as redrawing or forming with greater accuracy, speed and safety. More complex dials allow one press to blank and form several parts from multiple strips and then assemble the parts.

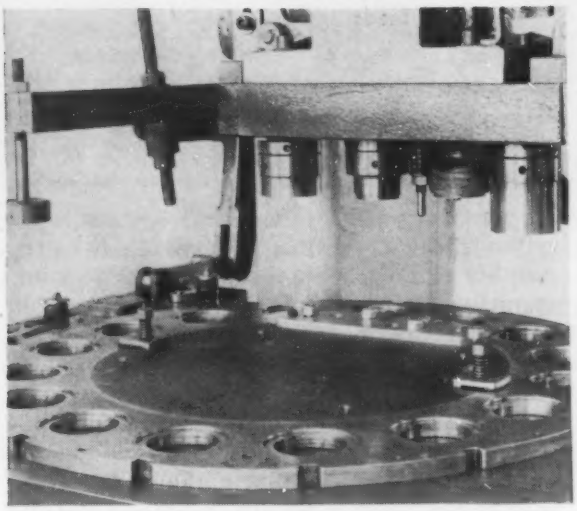
Despite the apparent length to which dial feeds have already carried the press, the end is far from being in sight. Each day, different and



FIVE HOPPERS bring bearing parts to dial feed for assembly at Matthews Conveyor Co., Elwood City, Pa. An automatic check for correct assembly and two closing stations are included.

◆ Press capacity in secondary and assembly operations can be increased through use of dial feeds . . . They carry tools and parts to the press punch, permit integration of several operations from blanking to assembly in one setup . . . Part quality is improved.

◆ Tooling costs can be reduced through use of simpler tools . . . Inspection can be "built in" the operation . . . Combination of operations in one press can help reduce floor space requirements . . . Punch press safety hazards can be reduced . . . Magazine, hopper and chute feeds help make the punch press a complete producing unit . . .



REDRAW AND TRIM operations are performed on this press equipped with hand-fed dial feed. Dial bushing is used for trim die, and to perform the first and second forming operations.

challenging problems are being solved by special tooling. Equipped presses today are doing jobs in and out of the metalworking field which make practical the application of the principles of automation in both small and large plants.

Where dial feed helps

Use of a dial is indicated when tooling becomes too complicated for progressive operations within the press or when an additional operation such as annealing, heat treating or deburring is required between the primary and secondary operations. Dials may be indicated if assembly requires more than one station.

Production requirements are the best indication of whether it is economically feasible to equip specific presses with dial feeds. One guide is the part itself. If there are variations in the part, secondary operations may often be done faster and cheaper with a dial feed.

If variations of the same blank are used to produce different parts and the quantity is not too great, a dial may be more practical from a tooling cost viewpoint than a progressive die. And, if one operator can run a battery of presses, then the automation of the feed provides substantial economy.

The dial feed helps solve several common plant problems. A dial permits use of simpler, less costly tooling. By keeping the operator's hand and arm away from the punch member, it increases operator safety and contributes materially to his working speed. The feed also reduces tooling costs by protecting tooling against unreasonable maintenance.

Rejects may be reduced by providing checking stations on the feed. Need for manual inspection is eliminated by incorporating inspection stations on the dial. The dial also solves the problem of assembly of multiple parts.

Use of the dial feed sometimes requires production of more uniform parts. More uniform material may also be required. Both these factors are generally reflected in a better product.

The operator synchronizes his motions to the dial rather than to the press. The dial, in effect, paces the operator rather than the operator pacing the press.

In most cases materials handling must be organized to prevent dirt and grease from mixing with materials. Dirty parts may cause automatic rejection. The raw material or part is brought to the dial by an automotic feed, hand feed or combination of these. Magazine, hopper and chute feeds are most common.

Several methods may be used to eject parts.

WHAT FEEDS TO USE

TOOL FEED:
Used primarily for coil material.

SLIDE FEED:
For accurate feeding of coil or strip material.

MAGAZINES:
Feeds strip or relatively flat parts.

HOPPER:
Used to select a part for correct positioning on dial, or deliver part in proper position.

CHUTE:
For short runs or where hopper or magazine type feeds are not feasible.

FRICTION DIAL:
Use where the part is stable enough to stand on its base (such as cartridges).

CONVEYORS:
Use to tie one piece of equipment to another machine. Use for hand feeding short runs or parts which do not lend themselves to automatic feeding.

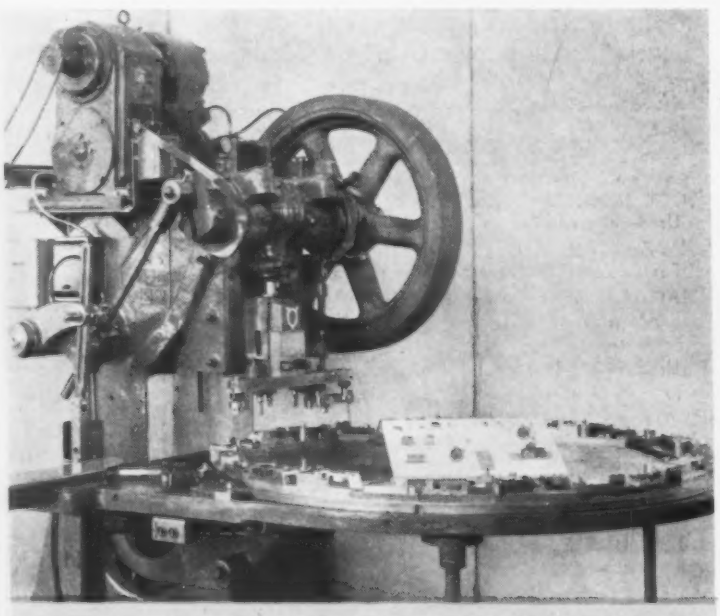
They may be pushed through variety, automatically picked-off, or hand removed. Size, finish, stability of the part, and the next step in the operation are factors determining selection of ejecting device.

For hand feeding, the operator should be able to use both hands. He should have sufficient dexterity to perform more than one action at the same time and be able to rapidly position parts with minimum effort. If adjustment of the press is not the operator's responsibility, then he requires no more skill than any other power press operator.

Presses equipped with dial feeds perform a wide range of operations. Relatively simple is an operation performed at Simmons Air Accessory Corp., Vergennes, Vt. The dial on this press is fed by two hoppers, one feeding nuts and the other a cap. The dial receives the nut and cap, carries them to stations where two parts are assembled and crimped into place. This is an operation in which the dial supplies accuracy as well as speed and, in this combination, has greatly increased production.

Dial and feeds combined

A combination of feeds and a dial perform an unusual operation for Ornstein & Co., England. This company uses a press to make cloth button backs. Using an O1 press with dial feed the complete operation is handled on a single press. The shallow cup-shaped metal button back is fed from a hopper to the dial.

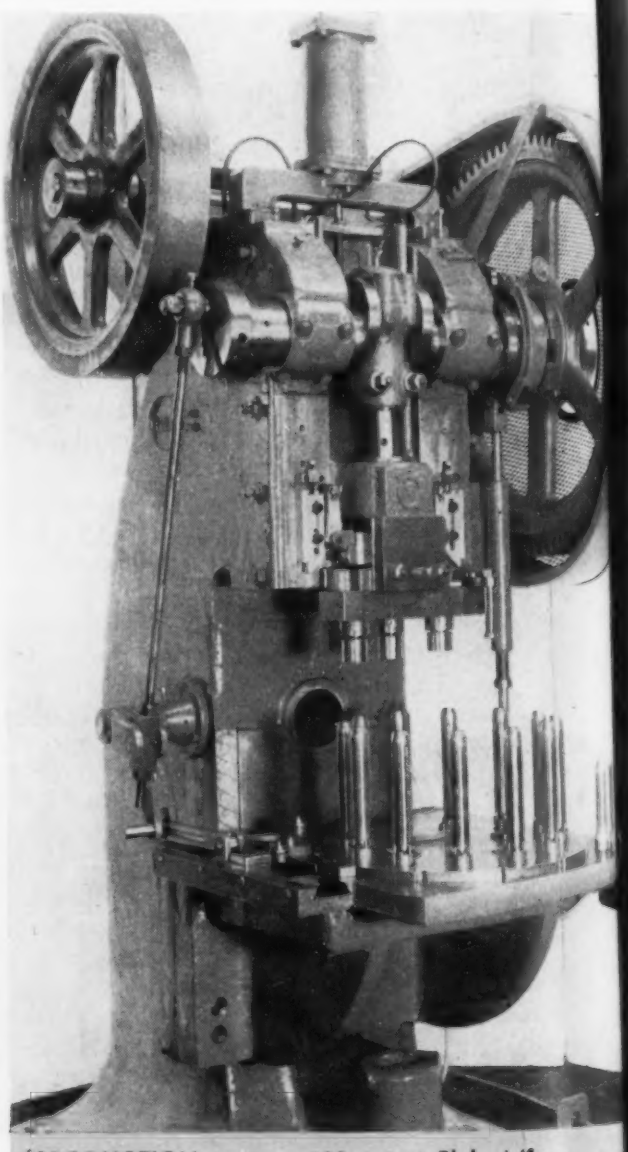


EIGHT-STATION dial feed, 60 in. in diam, designed for T. Cohn Co., assembles toy units.

The button back is brought into position and a round disk of cambric, fed by a roll feed, is punched out slightly larger than the button back and inserted into the hole in the metal cup. By means of a magazine feed, a strawboard disk is cut and delivered to the dial where it is pressed on top of the cambric to hold it in place. The dial enables the press to deliver 125 completed pieces per minute.

Typical of the type of tooling available with a dial feed and the advantages of such specialized equipment is the experience of the Blake Mfg. Co., Clinton, Mass. Blake uses its press on a pointing operation on flashlight cases to considerable advantage.

Under the old method, two presses and two operators produced an average of 16 pieces per minute. With one dial feed equipped press, one man produces 48 pieces for a production increase of 600 pct per man. It was also possible



PRODUCTION went up 600 pct at Blake Mfg. Co. with use of this dial feed combination.

to introduce a third operation in the dial to improve the finish of the case and reduce later polishing operations.

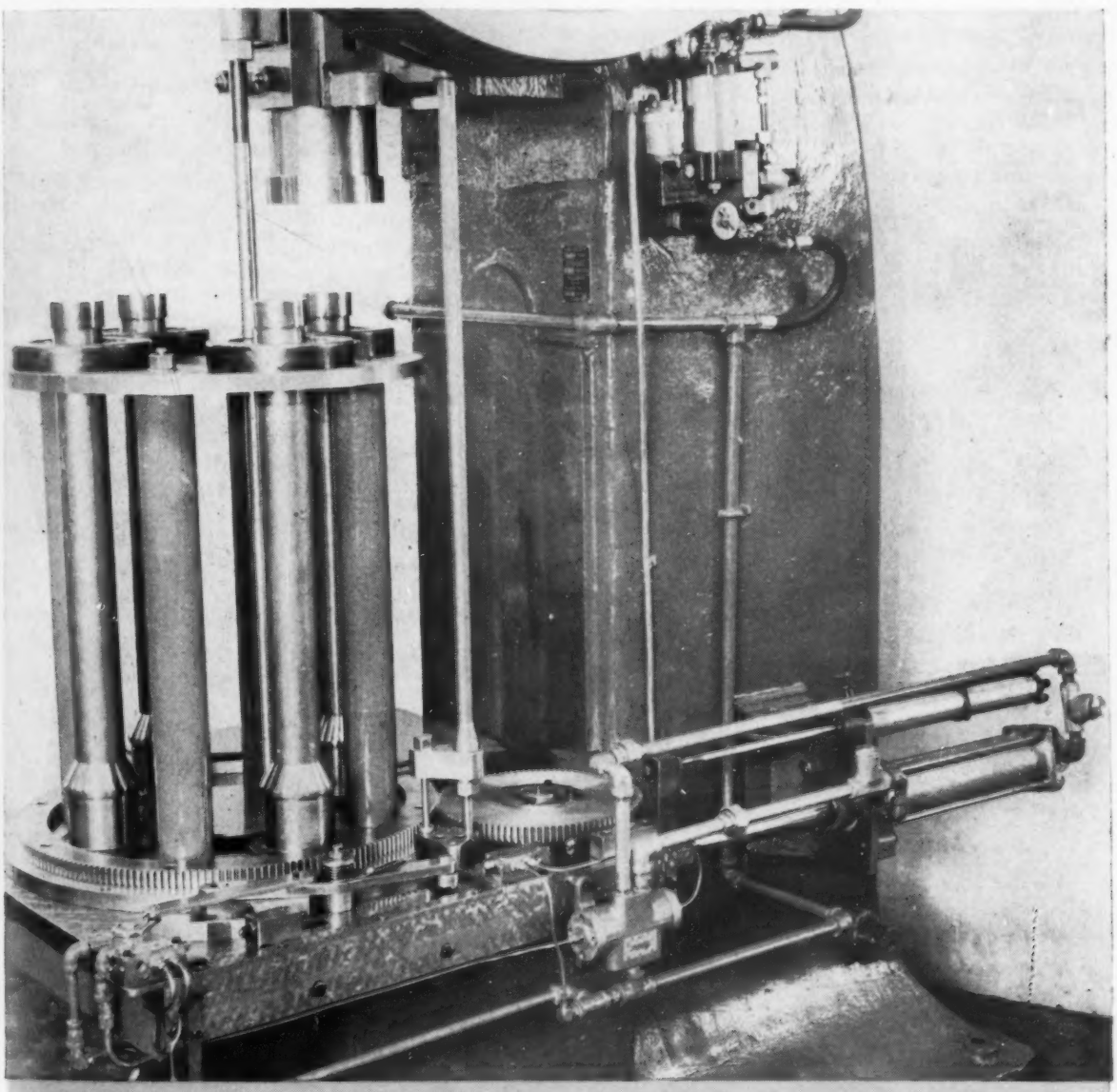
A major advantage of a press equipped to do a specific job is that it may turn a single machine into a complete production unit. In addition to savings accrued by increased production and lowered production costs, is the important saving of valuable floor space. In today's plant, where the cost per square foot may be extremely high, such savings are important.

Such a machine is the equipped press at P. R. Mallory & Co., Inc., Tarrytown, N. Y. A single press serves as the basis of a complete production machine. All operations involved in assembling small hearing aid batteries are performed on this unit. Three operators, each with his own emergency stop, produce 48 complete batteries per minute on this unit.

Versatility of the dial feed is shown in a special No. 3 press used for producing 105 mm shells. Indexing of the dial controls the press. The air driven dial trips the press after the dial reaches the correct position. Speed is variable, and production averages about 13 pieces per minute. For safety, the machine is equipped with a safety stop.

One of the larger dial feeds is used in assembling parts of a toy airport. Located in the plant of T. Cohn Co., Brooklyn, N. Y., the 8-station dial is 60 in. in diam. This machine, manned by six persons, produces and assembles 14 pieces a minute.

At times the dial may act as more than just a feed. At Hercules Food Products, Brooklyn, N. Y., a hand fed dial combines with a press for redrawing and trimming using a dial bushing as the trim die and then continuing into first and second forming. This No. 5 wide dial press produces 55 pieces a minute.



AIR-DRIVEN dial feed used in the production of 105 mm shells indexes press and trips it after the dial reaches the correct index position. The unit is equipped with a safety stop.

ASTE Show Previews . . .

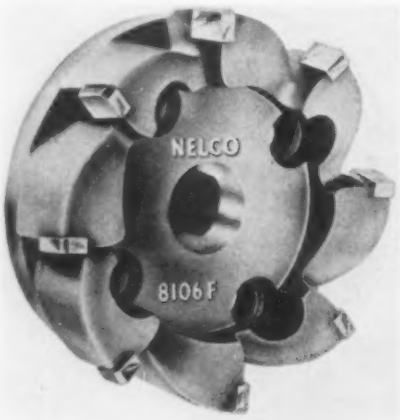
Cutting Materials:

Improved tools help solve tough machining problems.

Stronger Tool Bodies

All shell mills, 6 and 8-in. face mills and No. 50 NMTB taper shank end mills are carbide tipped and have new, longer life alloy bodies. Stronger than conventional steel bodies, these tools prolong cutter life materially. The alloy bodies are copper or cadmium plated for identification and protection against rusting. *The Nelco Tool Co., Booth 1413.*

For more data circle No. 40 on postcard, p. 151.



AMERICAN SOCIETY OF TOOL ENGINEERS INDUSTRIAL EXPOSITION

22ND ANNUAL MEETING

Philadelphia, April 26-30, 1954

REGISTRATION

9 am to 5 pm daily
At Exposition or at the Bellevue-Stratford and Benjamin Franklin Hotels.

EXPOSITION

9 am to 5 pm daily
At Convention Center

TECHNICAL SESSIONS

See program following pages

For Tough Materials

Two special premium carbide grades have been developed for extremely difficult machining applications. Other new items include: preformed helical blades for helical milling cutters, new drill tips for twist drills, and preformed hob blanks made to close tolerance. Eleven styles of single point standard carbide tools make up an available new line. Cutting edges are diamond ground. *Adamas Carbide Corp., Booth 951.*

For more data circle No. 41 on postcard, p. 151.

Lubricants "Built-In"

High speed "XL" tool steels feature "built-in" lubrication with uniformly distributed alloy sulphides. This provides a lubricant at the cutting edge without impairing the tool's cutting edge strength. Tool life tests have shown the benefits of these internal sulphides, and surface finish of workpieces has improved. "XL" steels are supplied in four types; each type can be furnished as bars, forgings, drill rod and tool bits. A new high carbon-high chromium die steel has free machining properties. *Latrobe Steel Co., Booth 1527.*

For more data circle No. 42 on postcard, p. 151.

No Chipbreaker Grinding

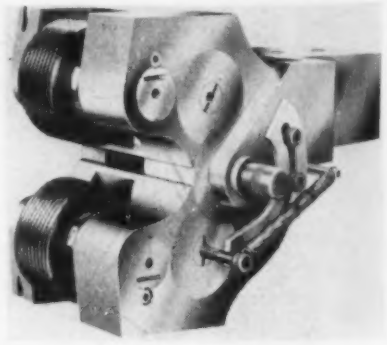
The new V-R Toolholder has a "built-in" carbide chipbreaker which eliminates chipbreaker grinding but provides correct chip formation over a wide cutting range for single chipbreaker width. Toolholder design permits using all of the carbide insert. Two new carbide inserts are designed for use in this toolholder system. One is the "Half-Length" ¾-in. long size; the other is a new "Throw-Away" length providing for use of all cutting edges without grinding. *Vascoloy-Ramet Corp., Booth 403.*

For more data circle No. 43 on postcard, p. 151.

Better Thread Rolling

Precision thread rolling to Class 4, longer roll life and a well-balanced workpiece microstructure are benefits of new principles incorporated in the improved LANROLL attachment for use with automatic screw machines. Two sizes are furnished, each of which is adjustable for precision work within its range. All attachment parts are built for long life and utmost precision in use on automatic screw machines. *Landis Machine Co., Booth 1738.*

For more data circle No. 44 on postcard, p. 151.



New Die Steel

A new analysis in a tool and die alloy combines the deep-hardening characteristics of air-hardening steels with the low temperature heat treatment possible in many oil-hardening grades. The new Vega alloy provides unusual heat treat-

Improved equipment, tools and methods point the way to higher production at lower cost . . . Here, classified for easy reading, are some of the latest cost-cutting items to be exhibited at the ASTE Show.

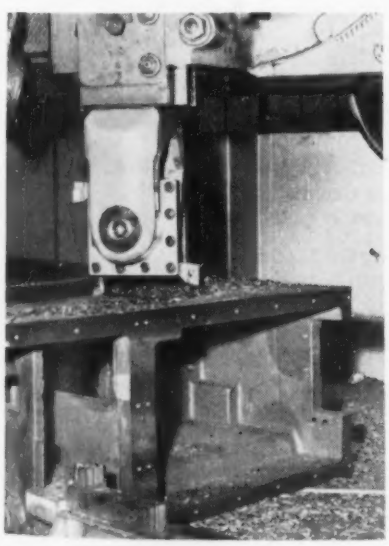
ing accuracy for large blanking dies, forming dies, heavy duty punches and dies with unbalanced sections. A new No. 10 special stainless steel permits economical, mass production of severely cold headed and upset fasteners and similar parts. *Carpenter Steel Co., Booth 102.*

For more data circle No. 45 on postcard, p. 151.

Saves Tool Changing

Davis 8-Position Tool Holders provide versatile and efficient tooling for vertical boring mills. Tool changing delay is eliminated in switching from one cut to another. With a flick of the wrist, the right tool is correctly positioned for such varied operations as boring, turning, facing, undercutting or chamfering. Two sizes are available. *Davis Boring Tool Div., Giddings & Lewis Machine Tool Co., Booth 1500.*

For more data circle No. 46 on postcard, p. 151.



Drills Deep Holes

Standard cutters for "Conner Type" spade drills come in 256 sizes from 1 1/64-in. through 5-in. diam and need only 8 holders to accommodate the complete size

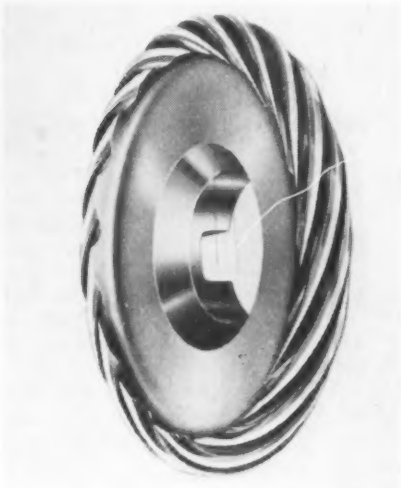
range. Due to their rigidity and the nature of the drill point they are said to drill from the solid in one operation. Advantages are claimed in drilling large, deep holes, especially in hard metals and alloys. Holders are adaptable to available shop equipment. *The Gairing Tool Co., Booth 225.*

For more data circle No. 47 on postcard, p. 151.

Milling Cutters

Constant engagement of at least 3 teeth on Hi-Helix milling cutters results in smooth finish. Metal is never "chopped" or "bulldozed" off the workpiece. Clean shearing action of teeth reduces chipping or breakage, allows smooth, fast milling on alloy steels or refractory metals. Advantages inherent to skiving tools are built into these cutters. *Douglas Tool Co., Booth 956.*

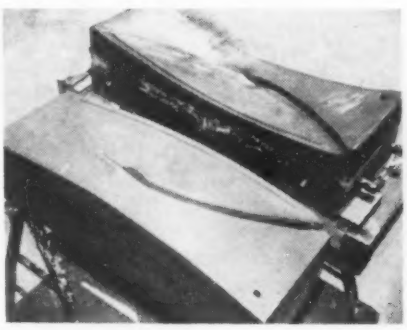
For more data circle No. 48 on postcard, p. 151.



Plastic Tooling Compounds

A variety of plastic tooling compounds offer specific advantages for tooling purposes. The L-900 and L-910 series are non-shrink, thermosetting, modified epoxy resins with maximum dimensional stability. Another series features an ethylcellulose base for plastic tooling requirements of high impact metal forming. *Rezolin, Inc., Booth 1914.*

For more data circle No. 49 on postcard, p. 151.



Optical Comparators

Two new optical comparators are available in 9 different models. Special fixtures include the latest Dual Lens Tracer with reticles and an orienting fixture. High velocity threading of stainless steel with carbide tipped chasers will be demonstrated on an automatic screw machine. A completely equipped chaser sharpening machine is said to free expensive grinders for other production. *Jones & Lamson Machine Co., Booth 1509.*

For more data circle No. 50 on postcard, p. 151.

Turn to Page 202

Technical Program

Up-to-date technical developments and solutions to some of metalworking's toughest problems will be covered in papers and panel discussions presented during the ASTE Industrial Exposition in Philadelphia, April 26 to 30. Here is a handy program of technical papers and discussions with the date, time and place of their presentation.

Monday, April 26

Rolled Extrusion of Thin-Walled Parts
W. N. Parker, Development Engineer
Tube Div., Radio Corp. of America

Rubber-Clamping Assembly of Thin-Walled Parts
F. R. Simpson, Director of Research & Dev.
Kuljian Corp.
1:30 pm Room 300 Convention Center

Surface Finish Control with Blast Cleaning
H. A. Oldenkamp, Director of Engineering
Vapor Blast Mfg. Co.

Ultrasonic Techniques in Industrial Cleaning
Dr. W. L. McCracken, Director of Research
Detrex Corp.
1:30 pm Arena Conference Room Convention Center

Production Planning and Control (Panel Discussion)
E. Kitzman, General Supt.
Link-Belt Co.
H. R. Murphy, Planning Dept. Head
Grumman Aircraft Engineering Corp.
N. M. Perris, Senior Associate
Stevenson, Jordan & Harrison, Inc.
W. L. Tann, Chief Industrial Planning Engineer
Bureau of Ordnance, Navy Dept.
C. Verkler, Asst. Manager of Manufacturing
Caterpillar Tractor Co.
J. R. Weaver, Manager of Mfg. & Engineering
Westinghouse Electric Corp.
3:00 pm Ballroom Convention Center

A Program for Developing Tool Engineers Into Manufacturing Executives
Dr. R. F. Pearse, Senior Associate
Worthington Associates, Inc.

Scanlon Employee Relations Plan at Different Production Levels
E. M. Dowd, Exec. Vice President
La Pointe Machine Tool Co.
8:00 pm Ballroom Bellevue-Stratford Hotel

Recent Developments in Analysis of Chip Formation
Dr. B. W. Shaffer, Project Director
Research Div., College of Engineering,
New York University

Turning Research Can Double Your Production Per Labor Hour
J. C. Herbert, Manager
Machine Tool Div., Jones & Lamson Machine Co.
8:00 pm Burgundy Room Bellevue-Stratford Hotel

Tuesday, April 27

Magnetic Holding of Ferrous and Nonferrous Materials
F. Suchanek, Field Engineer
Sundstrand Magnetic Chuck Div.

Jig Design for Multiple Automatic Operations
F. G. Zagar, Vice President & General Manager
Zagar Tool, Inc.
9:00 am Arena Conference Room Convention Center

Process Applications for Dual-Frequency Induction Heating
R. S. Segsworth, Director of Research
General Engineering Co., Ltd.

High-Production Tooling for Induction Heating
P. N. Sorenson, Chief Test Engineer
and
C. E. Glick, Production Engineering Manager
TOCCO Div., Ohio Crankshaft Co.
9:00 am Room 300 Convention Center

How To Plan a Transfer Machine
D. E. Hawkinson, Vice President
Machine Tool Sales, Greenlee Bros. & Co.

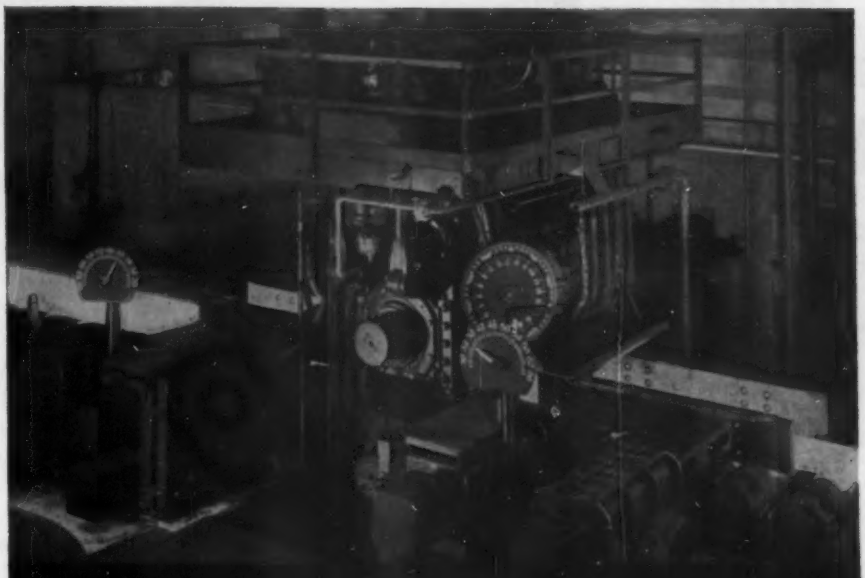
Creativity In Mechanical Design
H. A. Oldenkamp, Director of Engineering
and
L. Strauss, Project Manager
General Engineering Labs
American Machine & Foundry Co.
1:30 pm Arena Conference Room Convention Center

Changing Trends in Mechanical Fasteners
W. C. Stewart, Technical Advisor
Industrial Fasteners Institute

Fastening Techniques for Small Assemblies
V. L. Bradford, Vice President in Charge of Sales
Milford Rivet & Machine Co.
1:30 pm Room 300 Convention Center

Turn to Page 250

Newport Steel
HELPS KEEP YOUR INVENTORY DOWN



Flexibility in operation enables Newport Steel to adjust their schedules and complete your order when you want it, always strictly according to your specifications. From the heart of America's greatest industrial growth, Newport makes fast, economical delivery, too, by rail, barge or truck. You thus avoid the expense of heavy inventories while ensuring the continuity of your production and obtaining the high quality for which Newport has been famous for 69 years.

PRODUCTS OF NEWPORT STEEL

- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Electric Weld Line Pipe
- Hot-Rolled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

ECONOMICAL WATERAIL DELIVERY

Newport Steel is situated on the Mississippi-Ohio River system and the great Cincinnati rail hub. With the advantage of location, new river barge facilities and seven major railroads, Newport gives economical, dependable delivery to industrial areas throughout the Middle West and South.

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CORPORATION
NEWPORT, KENTUCKY

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Number One Name
In Socket Screws & Keys
ALLEN

Don't take it for granted that any hex socket screw is an Allen. Your Allen Distributor *alone* can offer you

1. **ALLENPOINT SET SCREWS** with the new smaller point — proved by impartial laboratory tests to have greater locking power and vibration resistance, plus uniformly high shaft holding power, compared with conventional cup point screws and those with serrated or angled points.
2. **LEADER POINT CAP SCREWS,** for substantially reduced chance of thread injury or damage to threaded holes.
3. **ALLENOY STEEL** — with the strength and temper to permit the use of smaller sizes, and make button head and flat head screws practical despite necessarily shallower sockets.
4. **ALLEN PROGRESSIVE PRESSUR-FORMING,** producing contoured uncut fiber flow, from head to point. A process originated and perfected by Allen.

Be sure to get Allens in the black and silver striped box, sold only through leading Industrial Distributors. Write us for technical information.

ALLEN
MANUFACTURING COMPANY
Hartford 2, Connecticut, U.S.A.

Tool Show Previews

Engineering

Continued from Page 199

Cutting Tools:

Boost production, cut machining costs with better tools.

Shears Intricate Shapes

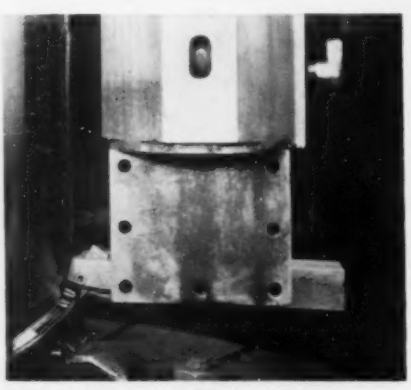
Accurate shearing of straight lines and intricate shapes is easily handled on a new lever punch and shear. Conversion from punch to shear is no problem. A large selection of punches and dies is available for hole-forming, notching,

trimming, etc. The machine will shear from front to back or left to right and will slit 48-in. wide sheets of infinite length down the center. *Niagara Machine & Tool Works, Booth 1242.*

For more data circle No. 51 on postcard, p. 151.

Mechanical Chip Breaker

Heavy duty inserted carbide turning tools provide positive holding and utilize 80 pct of carbide. Alloy steel tool holder has adjustable, mechanical chip control block to allow chip control without nega-



tive rake or ground-in chip grooves. Typically used for rough turning steel mill rolls, heavy shafts, large drums and heavy steel castings. *The Viking Tool Co., Booth 542.*

For more data circle No. 52 on postcard, p. 151.

IF YOU WANT MORE DATA

You may secure additional information on any item previewed in this section by using the reply card on page 151. Just circle the number on the postcard.

Carbides Do Many Jobs

Rugs made from new synthetic yarns are cut with cemented carbide hooks and blades. Special clamped inserts machine mounted railroad car wheels, other inserts of titanium carbide resist wear in high velocity feeding of hot steel rod into roll grooves. Profiling tools feature horizontally-clamped triangular inserts of cemented carbide to withstand side thrust when cutting to left or right. *Kennametal, Inc., Booth 1627.*

For more data circle No. 53 on postcard, p. 151.

New Twist Drill Design

To speed drilling of cast iron, a new twist drill features heavier carbide tips blending into the spiral, plus radially relieved end grind, a heavier web and polished flutes.

Speeds up to 14 ipm have been found practical with this new type drill construction, and more holes per grind have been obtained. *Super Tool Co., Booth 623.*

For more data circle No. 54 on postcard, p. 151.

Machine Tools:

New methods, machine designs help cut production costs.

Versatile Cutoff Saw

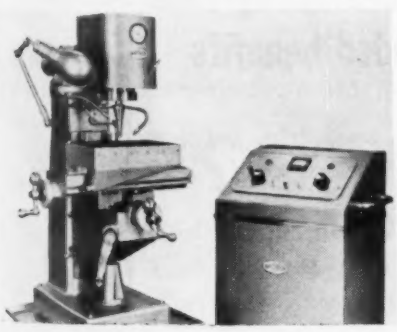
Increased plant flexibility in use of abrasive cut-off machines is possible with a dry-cutting machine which may be mounted on a hand or powered truck. The Radiac No.

2 Type P Traveler may be moved through the shop for plant maintenance work or for production cutting. It's powered by a 10-hp motor and mounts an 18-in. diam abrasive wheel. *A. P. de Sanno & Son, Inc., Booth 1065.*

For more data circle No. 55 on postcard, p. 151.

New Cutting Method

A metal cutting machine tool using ultrasonic energy and abrasives in liquid suspension, offers unique advantages in cutting intricate shapes in hard, brittle materials. A transducer, vibrating at



approximately 25,000 times per second, drives the abrasive particles against the work with forces up to 5000 to 10,000 times their normal weight. Carbides, tungsten, molybdenum, glass, quartz, gems may be cut. *Raytheon Mfg. Co., Booth 2101.*

For more data circle No. 56 on postcard, p. 151.

Turn Page

the A-B-C of M-S-T

A ALWAYS MAKES POSSIBLE
B BETTER PRODUCTS
C AT LOWER COST

Michigan
Electric Resistance
WELDED
STEEL
TUBING

A Quality Product

ROUND
⅜" to 4" O.D. 8 to 22 gauge
SQUARE-RECTANGULAR
½" to 2" O.D. 20 gauge
1" to 2¼", 14, 16, 18 gauge
Carbon 1010 to 1025

Michigan Tubing
has uniform strength, weight, ductility, I. D. and O. D., wall thickness, machinability, and weldability. It can be flanged, expanded, tapered, swaged, beaded, upset, flattened, forged, spun closed, fluted, and rolled. Available in a wide range of sizes, shapes and wall thicknesses, prefabricated by Michigan or formed and machined in your own plant.

Plus Fabricating of our own tubing Michigan is interested ONLY IN THE FABRICATION OF Stainless steel, copper, brass and aluminum tubing.

Vacuum Cleaner Handle

An excellent example of how the use of welded steel tubing simplifies assembly of parts, cuts down costs, is the cleaner handle made by Michigan for manufacturers of vacuum cleaners.

The handle is shipped by Michigan ready for chrome finishing and assembly to the vacuum cleaner. Stampings for the cord holders are welded to the tubing, an elongated hole punched for the interior wire cord and tumbler switch. The surface finish of the cold rolled steel tubing, as processed by Michigan, is suitable for polishing and chrome plating.

No matter what you manufacture, Michigan engineers will be pleased to consult with you concerning an application of welded steel tubing to improve your product and lower production costs.

Consult us for engineering and technical help in the selection of tubing best suited to your needs.

THE OLDEST NAME IN ELECTRIC RESISTANCE WELDED STEEL TUBING
Michigan STEEL TUBE PRODUCTS CO.

More than 35 Years in the Business
9450 BUFFALO STREET • DETROIT 12, MICHIGAN
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CUTTING. New S.E.C.O. keeps parts and tools cooler. Tools last longer, require fewer grindings; production is increased; finishes are uniformly good.

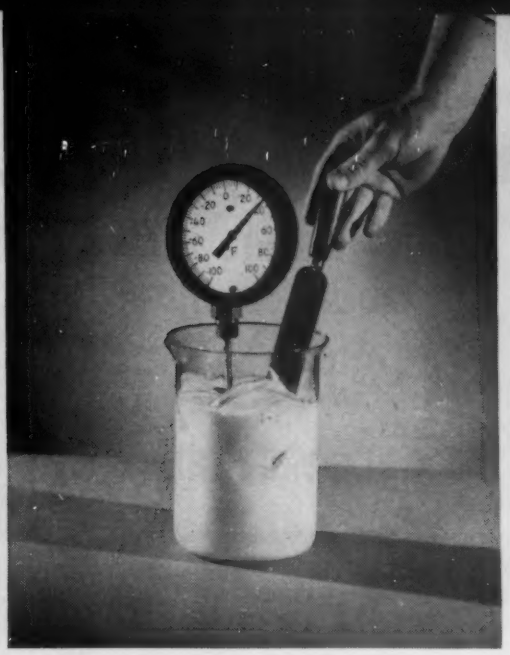
Now Better Than Ever!

Sunoco Emulsifying Cutting Oil

New refining facilities improve industry's most widely used cutting oil and permit it to give these added benefits

- **HIGHER MACHINING EFFICIENCY**—better finishes, longer tool life, increased production in cutting operations
- **INCREASED DETERGENCY**—particularly important in grinding operations—provides better surface finishes, prevents loading and glazing of the wheel, prolongs wheel life
- **BETTER MIXING QUALITIES**—in hot, cold or hard water
- **A PURER, CLEANER CUTTING OIL**—whiter, more stable emulsions; cleaner parts and machines; better operator acceptance
- **EASIER HANDLING**—pumps from storage tanks more readily, flows from drums faster
- **GREATER VERSATILITY**—can be used for rolling, washing and rustproofing as well as cutting and grinding

MIXES BETTER IN HOT WATER. New S.E.C.O. mixes and remains stable even at 180 F. This permits its use in washing and rustproofing.

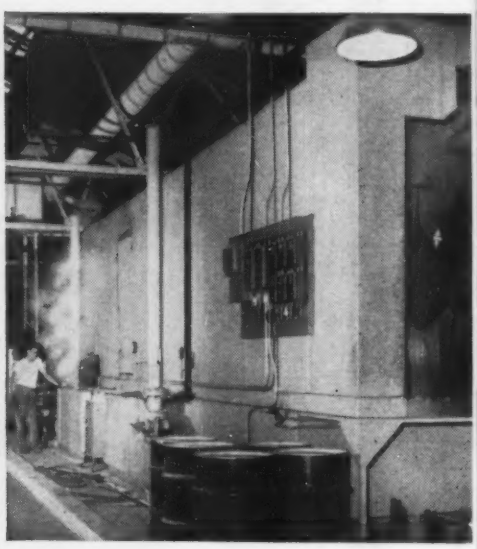


MIXES EASILY IN COLD WATER. New S.E.C.O. forms stable emulsions in the coldest water . . . even ice water does not affect it.

MIXES READILY IN HARD WATER. New S.E.C.O. eliminates the need for special hard-water grades of emulsifying cutting oil.

GRINDING. New S.E.C.O. improves surface finishes because its increased detergency prevents loading and glazing of grinding wheels, prolongs wheel life.

RUSTPROOFING. New S.E.C.O. is a better hot rustproofing medium. It forms stable emulsions, coats metal parts uniformly, protects them against rusting.



WASHING. Because of its increased detergency and its ability to mix and remain stable in hot water, New S.E.C.O. is better for removing grease and dirt from metals.

TEST THIS NEW S.E.C.O. IN YOUR OWN PLANT. For more information, call your nearest Sun office or write SUN OIL COMPANY, Phila. 3, Pa., Dept. IA-4.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Made by the producers of famous Blue Sunoco Gasoline and Dynalube Motor Oils

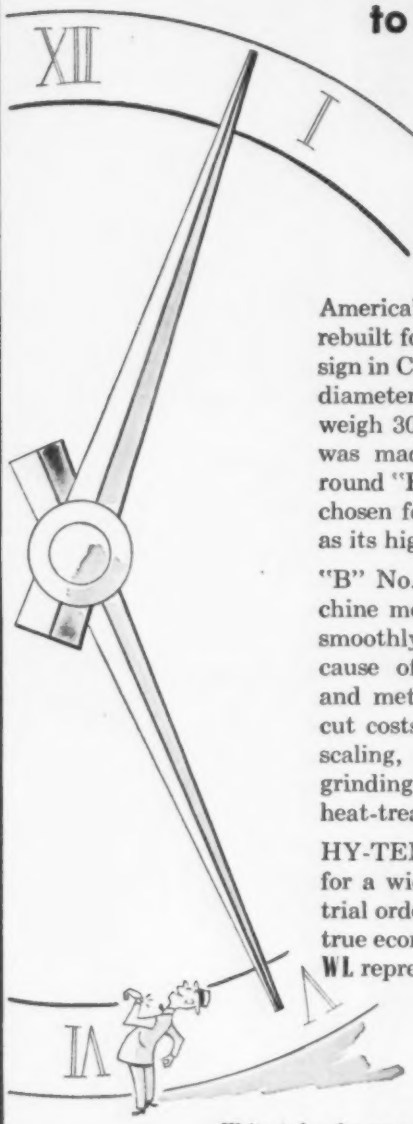
OVER ONE HUNDRED YEARS OF CONTINUOUS SERVICE. ROUNDS, SQUARES, FLATS, HEXAGONS, OCTAGONS

it's the right time

to Investigate the Qualities of

HY-TEN

ALLOY STEEL



America's largest clock was recently rebuilt for a spectacular illuminated sign in Chicago. It measures 50 ft. in diameter — hands and movement weigh 3000 lbs. The new driveshaft was made from 6 ft. of 3½-inch round "B" No. 3X heat-treated bar, chosen for its machinability as well as its high physical properties.

"B" No. 3X heat-treated bars machine more readily and finish more smoothly than standard alloys because of their particular analysis and method of manufacture. They cut costs by eliminating distortion, scaling, straightening — and often grinding — as well as the cost of heat-treating finished parts.

HY-TEN "B" No. 3X bars are used for a wide range of applications. A trial order will convince you of their true economy. Just call your nearest WL representative.

Write today for your FREE COPIES of Wheelock, Lovejoy Data Sheets, indicating your title and company identification. It contains complete technical information on grades, applications, physical properties, tests, heat treating, etc.

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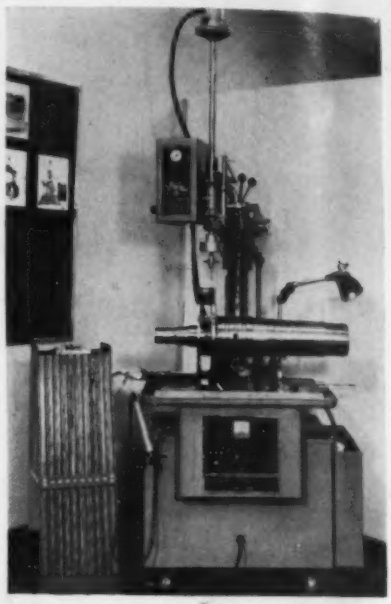
—Tool Show Previews—

Drills difficult metals

An improved, fully automatic electron drill, the Elox M-300, has been developed to cut costs of expensive tool salvage operations and to drill holes in hard to machine metals. Parts can also be machined

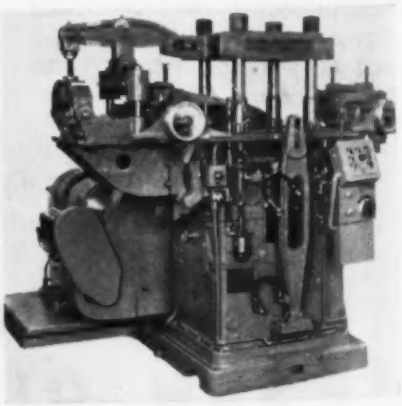


after hardening. Parts can also be machined to tolerances close enough for finished grind. The machine using copper electrodes is also useful in removing broken tools from machined components. *Elox Corp. of Michigan., Booth 1342.*

For more data circle No. 57 on postcard, p. 151.

Aid to press output

A 60-ton dieing machine equipped with a multiple-station progressive die for the production of a drawn stamping embodies features assuring both high production and high



part quality. These include: automatic double roll feed with roller clutch drive and water-cooled roll

Turn Page

through communication . . .

More than 4,000 years ago, this receipt* for 5590 large bundles of reeds was inscribed on clay in cuneiform writing. Found in Iraq among the famous Kish ruins, the inscription was dated in 2226 B.C.

*Courtesy of Chicago Natural History Museum

FIRE CLAY

. . . ageless contribution to man

through industry . . .

Today, fire clay is even more important to man. For without fire clay refractories, the furnaces and ladles of industry could not melt or pour the many tons of steel, iron and other metals so necessary to our modern economy. By providing the important protective lining, the fire clay makes its contribution to industrial progress.

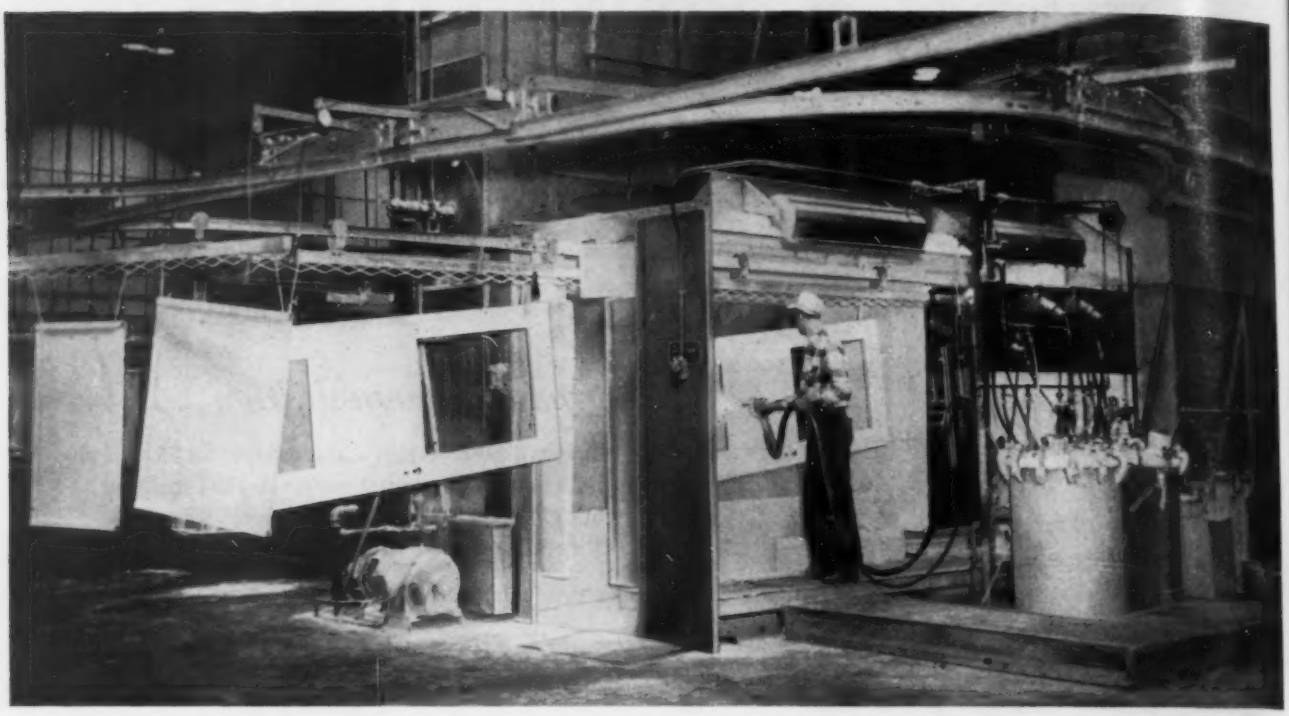
A leading source of fire clay refractories is:

ILLINOIS CLAY PRODUCTS COMPANY

Sales Office: 208 S. La Salle Street, Chicago, Illinois
Main Office: Barber Building, Joliet, Illinois

MANUFACTURERS OF GOOSE LAKE AND CHEM-BRIX REFRACTORIES AND THERM-O-FLAKE INSULATION

DeVilbiss helps you get the most from the spray method



Panels, doors and fittings for Movable Interiors are given a prime coat of enamel in DeVilbiss Water-Wash Spray Booth — one of eight at The E. F. Hauserman Company.

Lifetime finish applied to movable walls with DeVilbiss equipment

The E. F. Hauserman Company uses eight DeVilbiss Spray Booths in its busy production line to paint movable wall panels, doors and fittings.

"We like DeVilbiss' versatility for our Movable Steel Interiors . . . it does a good job for us," says Don Clapp, general superintendent of The E. F. Hauserman Company, Cleveland, Ohio – the nation's oldest and largest manufacturer of movable partitions and wainscot.

One of the attractive, money-saving features of Hauserman Movable Interiors is that they'll stay new looking almost indefinitely *without repainting!* This feature alone saves thousands of dollars in maintenance costs for offices, schools, laboratories, hospitals and industrial plants that use Hauserman Movable Interiors. Hauserman uses DeVilbiss equipment extensively – Spray Guns, Spray Booths, Pressure-feed Tanks, Hose and Connections – to apply its exclusive, lifetime surface finish to its products.

If you, too, would like to get the most from the spray method, get full data about DeVilbiss equipment from your nearest DeVilbiss jobber or branch office, today. Or write us direct for free literature.

THE DEVILBISS COMPANY
Toledo, Ohio

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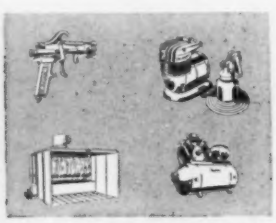
Branch Offices and Distributors in Principal Cities Throughout the U. S., Canada and the World

Spraying saves one-fourth the time . . . up to 50% in overall painting costs. On many surfaces, like acoustical tile, it is the only practical method.

Automatic spraying is cutting costs for many manufacturers. DeVilbiss has a wide variety of standard automatic spraying machines to serve you.



For fully coordinated spraying equipment: Spray guns, air compressors, spray booths, hose and all necessary accessories, DeVilbiss can serve you best.

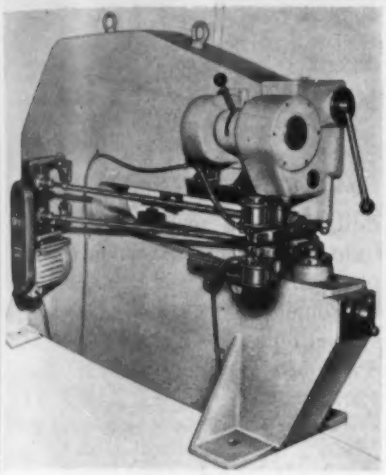
FOR BETTER SERVICE, BUY
DEVILBISS

feed brakes, adjustable scrap cutter attachment, automatic lubrication to the principal bearings. *Henry & Wright Div. of Emhart Mfg. Co., Booth 1060.*

For more data circle No. 58 on postcard, p. 151.

Accurate high speed cutting

Steel disks and circles can be cut on a production basis with the new Pullmax Power Feed used on Pullmax major model P-S and D-3. It reduces manpower, speeds cutting and removes the variables caused

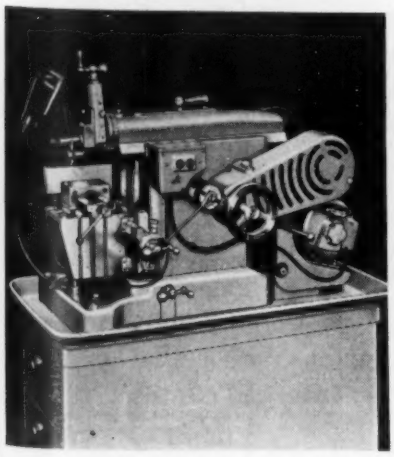


by hand feeding. Straight, circle and irregular cutting, inside or outside of the metal may be done. Other tools permit beading, folding or joggling, nibbling and louvering. *American Pullmax Co., Inc., Booth 1703.*

For more data circle No. 59 on postcard, p. 151.

Force feed lubrication

An improved 7-in. bench shaper uses a circulating force-feed lubrication system to improve precision. Dovetail bearings, bull gear teeth and crank pin slide bearings, receive direct and continuous oil flow



pumped from the reservoir at the shaper base. All working parts within the column are bathed in oil. The improved model includes an enlarged T-base for controlling vibration. *South Bend Lathe Works, Booth 1709.*

For more data circle No. 60 on postcard, p. 151.

Reduces metal layout

An electro-mechanical unit automatically drills center holes on flat metal as well as castings without layout. It will also drill Bakelite, slate and marble and crackle finish metal. Hole location is set on deci-

mal dials on a separate control board. Drill positions itself and drills holes to a predetermined depth. Any number of holes can be located and drilled in a fraction of time required by existing methods. *Hillyer Instrument Co., Booth 2107.*

For more data circle No. 61 on postcard, p. 151.

Combines speed, precision

Small precision parts are produced at high speeds on the new Strohm M205 Swiss type automatic. Capacity is ¾ in. (20 mm) and provisions have been made for use of five tools. Turning length is 4 in. with flat cam and 6 in. with bell

cam. *Hudson Automatic Machine & Tool Co., Booth 2113.*

For more data circle No. 62 on postcard, p. 151.

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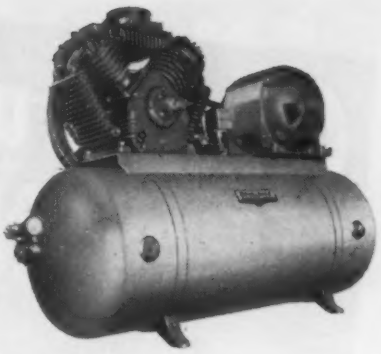

22.6% more air per power dollar

It's a fact! By actual test, DeVilbiss Air Compressors deliver as much as 22.6% more air per power dollar than the general run of compressors. Many times, you can pay for a new DeVilbiss Air Compressor out of power savings alone!

Every DeVilbiss Air Compressor, from ½ to 15 hp. offers you:

- **Dependable DeVilbiss Compressor Unit**
- **Check Valve Manifold**
- **Automatic Pressure Switch**
- **Quality Electric Motor or Gas Engine**
- **A.S.M.E. Approved Tank**
- **Outlet Manifold**
- **Quiet Efficiency Drive**

For a complete checkup on your compressor needs, contact your local DeVilbiss jobber. There's no obligation.

THE DEVILBISS COMPANY
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FOR BETTER SERVICE, BUY
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Quality based on METALLURGICAL LEADERSHIP • •

CHIEF SANDUSKY

CENTRIFUGALLY CAST, NON-FERROUS RINGS, ROLLS, LINERS, TUBES, BUSHINGS, BEARINGS, and SLEEVES.

Chief Sandusky knows that every day it must justify the reputation it has earned—since 1907—as the authority on non-ferrous centrifugal castings. Advanced research facilities is an important reason why users of non-ferrous cylinders have learned to depend on Chief Sandusky as their source of supply.

Not only do specialized metallurgists rigidly control the quality of these centrifugal castings, they are alert scouts and guides along the trail to improvements. And they welcome the challenge of metallurgical problems to solve so that they can apply their skills to produce the right answer —the satisfactory solution.

Beginning with research laboratories and all down the line through highly specialized production processes—refined from years of gaining knowledge through experience —every step of the way proves that the best in centrifugal non-ferrous castings bear the name, "Chief Sandusky."

C. M. Lovsted & Co., Seattle, Wash. Tyne Bros., Birmingham, Ala. Cordes Bros., San Francisco and Long Beach, Calif.

SANDUSKY FOUNDRY and MACHINE CO.

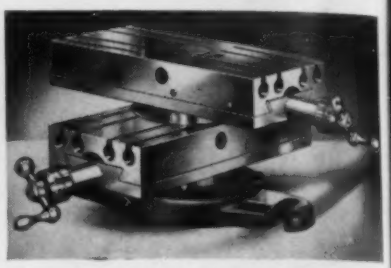
615 W. Market Street Sandusky, Ohio

Machining Accessories:

Improved units expand capacity flexibility of machine tools.

Table serves many uses

Combination angular and straight-line cuts can be made on shapers, milling machines and grinders with a new universal table. On a drill press, it permits accurate spacing, and by chucking an end

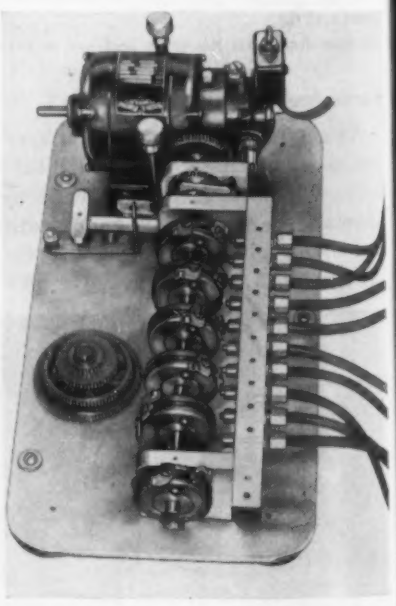


mill, the drill press converts to a light milling machine. On the face plate of a lathe, the table will give micrometer accuracy in boring spaced holes for jigs and die blocks. *South Bend Lathe Works, Booth 1709.*

For more data circle No. 63 on postcard, p. 151.

Controls many sequences

An electro-pneumatic timer, with a number of rotors and cams, controls the action of air cylinders in an infinite number of sequences. A small electric motor is geared to



the cam shaft. Variations are obtained by moving the cams. *Mead Specialties Co., Booth 1907.*

For more data circle No. 64 on postcard, p. 151.

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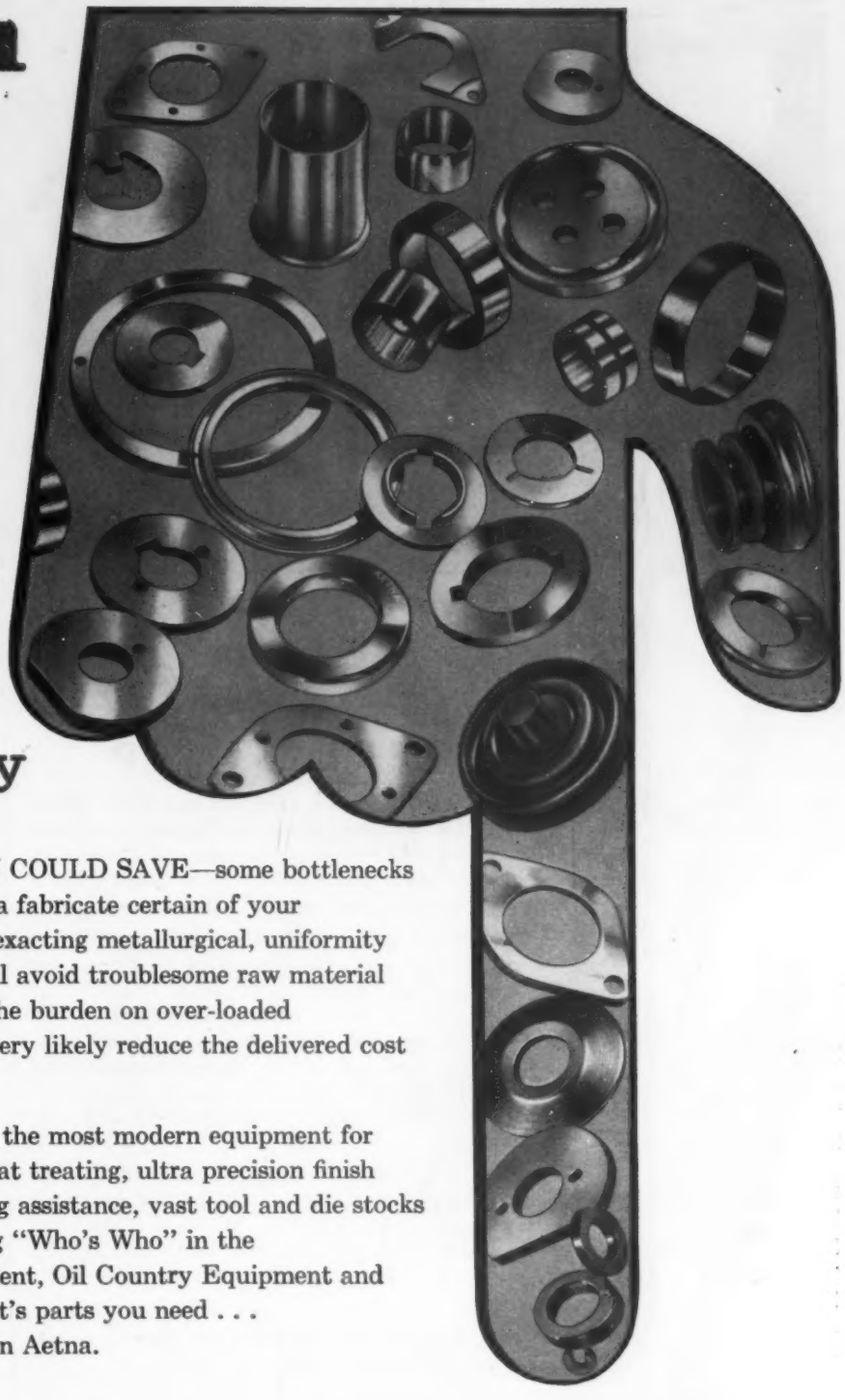
QUALITY Parts

by Aetna

...speed up assembly ...cut production costs... boost product dependability



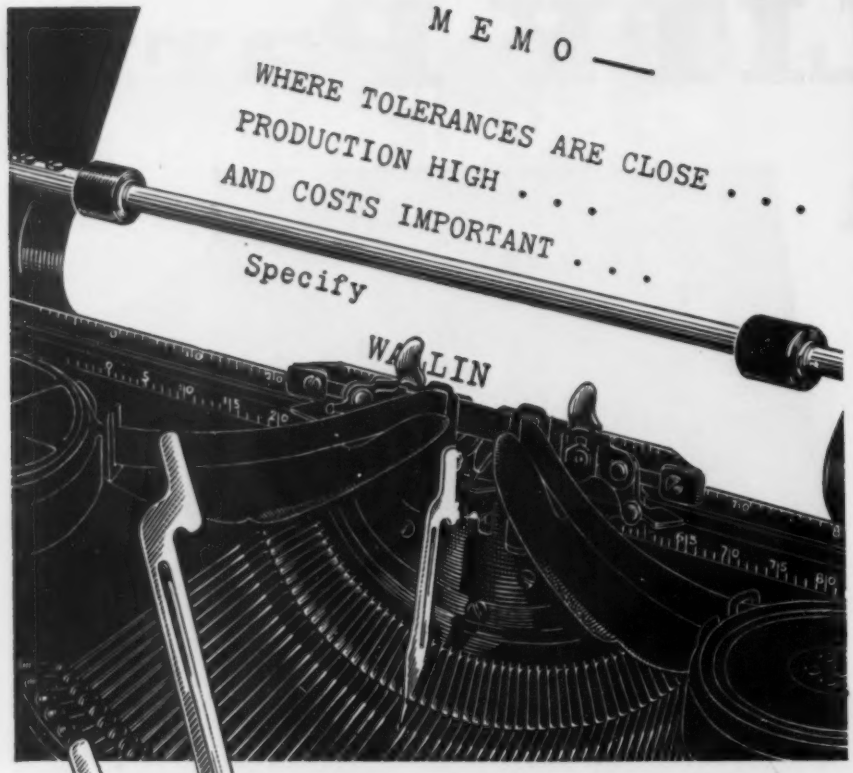
MAYBE THERE'S A LOT YOU COULD SAVE—some bottlenecks you could break—by letting Aetna fabricate certain of your assembly parts . . . to your most exacting metallurgical, uniformity and tolerance specifications. You'll avoid troublesome raw material procurement problems, decrease the burden on over-loaded equipment, save man-hours and very likely reduce the delivered cost of your product to boot.

Aetna's versatile facilities include the most modern equipment for stamping, piercing, machining, heat treating, ultra precision finish grinding plus complete engineering assistance, vast tool and die stocks and 38 years experience in serving "Who's Who" in the Automotive, Agricultural Equipment, Oil Country Equipment and General Industrial Fields. When it's parts you need . . . and quality is a MUST . . . call on Aetna.

AETNA BALL AND ROLLER BEARING COMPANY
DIVISION OF PARKERSBURG-AETNA CORPORATION
4600 Schubert Avenue, Chicago 39, Illinois

Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings • Miscellaneous Precision Parts

Aetna



WALLINGFORD

CLOSE-TOLERANCE STEEL STRIP

When it comes to precision parts like type bars, leading typewriter manufacturers specify Wallingford Steel Strip. They've found that the smooth surfaces and closely held thickness tolerances mean reduced fabricating and finishing costs and insure accurate spacing with smoother, quieter typing action.

The uniform high quality of Wallingford Steel Strip and Tubing doesn't just happen; it's the result of experience, know-how and a determination to produce the best . . . combined with the finest, most up-to-date equipment available. Our new Sendzimir mill, for example, can roll steel strip down to .002" thick and . . . equipped with the most advanced continuous gages . . . will maintain accuracies to ±.0001".

A growing list of satisfied customers look to Wallingford Steel for those important extra values in product quality and service. You too will find that Wallingford can meet your most exacting specifications for size, finish, analysis and temper . . . and can deliver *what* you want *when* you want it.

Call us today. We will welcome the opportunity to cope with the tough problem.

THE WALLINGFORD SINCE 1922 STEEL CO.

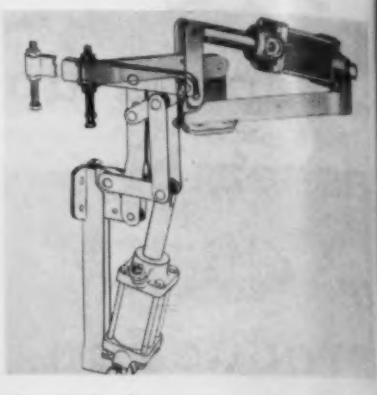
WALLINGFORD, CONN., U.S.A.

LOW CARBON • HIGH CARBON • ALLOY • STAINLESS • STRIP and TUBING

—Tool Show Previews—

Eases clamping problems

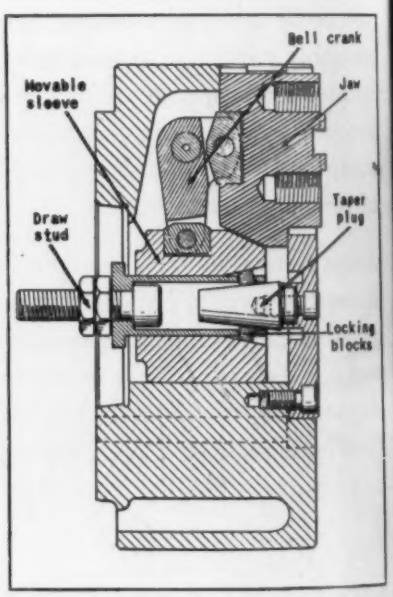
Air-operated clamps, having toggle action, overcome the problems where space in the horizontal plane is too limited for a conventional air clamp. It can be mounted in the vertical position alongside the work so that the double-toggle arm can swing directly over the work. *Lapeer Mfg. Co., Booth 1350.*



For more data circle No. 65 on postcard, p. 151.

Chuck features safety

An important feature of a new chuck is that it will remain locked in position until it is positively opened by the operator. Centrifugal force and power failure will not cause release of the work when the chuck is revolving. Locking action results from wedging locking blocks against a tapered plug. *Logansport Machine Co., Booth 1550.*



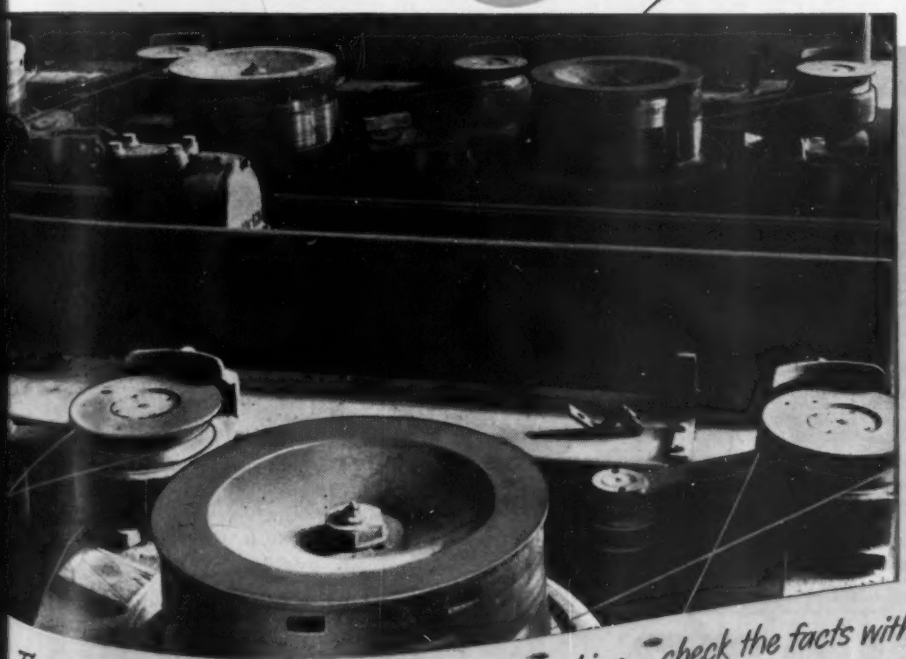
For more data circle No. 66 on postcard, p. 151.

Turn Page

CONTROLLED SPEED—

A DISTINCTIVE FEATURE OF ALL-

Vaughn® MOTOBLOX®



The speed of each block is AUTOMATICALLY controlled to meet the preset speed of the finishing block—thereby eliminating SLIP and accumulation of wire on intermediate blocks.

The Vaughn MOTOBLOX is a truly non-slip machine — check the facts with a Vaughn engineer!

"Quick on the Draw!"

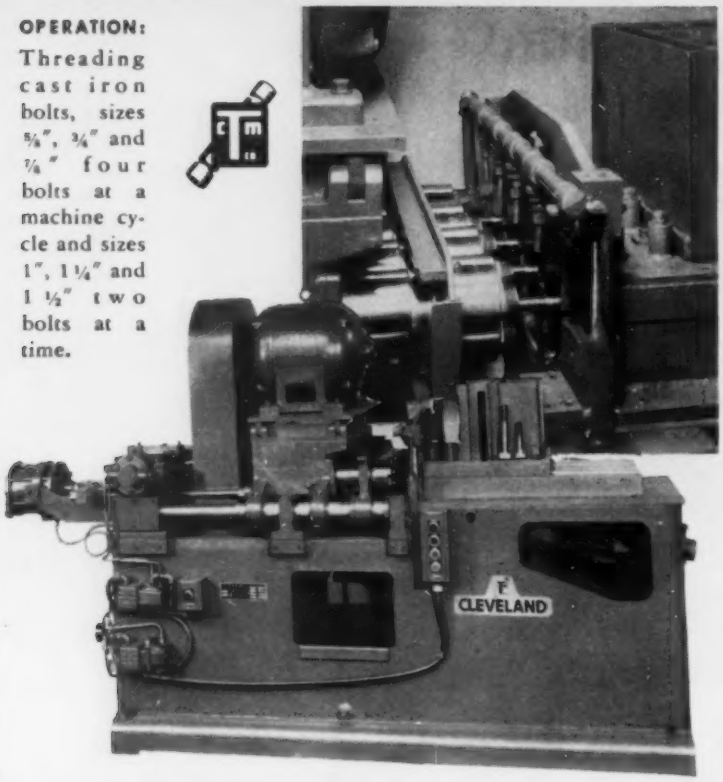
THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

Another Cleveland Design to Speed Production!

OPERATION: Threading cast iron bolts, sizes ⅝", ¾" and ⅞" four bolts at a machine cycle and sizes 1", 1¼" and 1½" two bolts at a time.



CLEVELAND BOLT THREADING MACHINE

Produces 857—⅝"—11 Pitch Cast Iron Bolts per hour @ 100% Efficiency

DESCRIPTION: A Horizontal Four-Spindle Machine with magazine loaded feeders for automatically feeding and discharging cast iron bolts. On the rear of the base the drive unit and four-spindle head is mounted. The four-spindle head has four spindles mounted in a cast iron housing geared to drive together from a drive shaft on the rear of the housing. The spindle assembly mounted on heavy round hardened and ground ways to move forward and back at the back of the drive assembly housing the drive shaft extend through the rear to a split nut and lead screw assembly.

The four-spindle head is driven continuously by the drive motor, feed in by lead screw and split nut, rapid return by air.

On the front of the machine, an air-operated slide to take interchangeable jaws for taking bolts from the bottom of stack magazines and moving forward to threading position. The bolts are clamped into position by an upper clamp plate operated by an air cylinder through a toggle linkage.

Write today for Catalog No. IA-54.

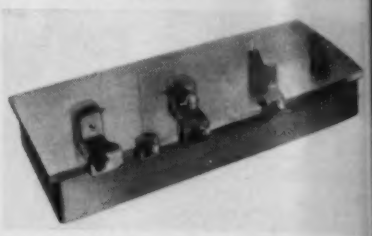
CLEVELAND tapping machine co.

A Subsidiary of AUTOMATIC STEEL PRODUCTS, INC. • CANTON 6, OHIO

—Tool Show Previews—

Meets inspection needs

All normal requirements of an inspection department have been integrated into a single device, called the V-Liner inspection unit. The unit includes a surface plate,

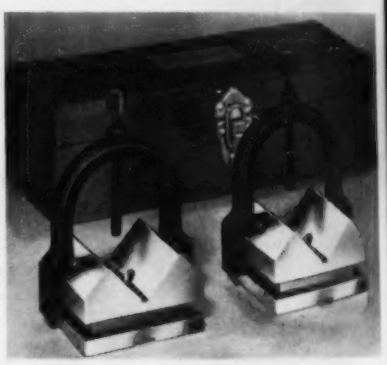


adjustable bench centers, V blocks, sine plate and indicator attachment. It also has an exclusive concentricity checking fixture. *Swanson Tool & Machine Products, Inc., Booth 1968.*

For more data circle No. 67 on postcard, p. 151.

V blocks remain stable

Complete dimensional stability, resulting from closely controlled heat and cold treatments, gives Uni-V-Blocks exceptional accuracy. The blocks enable tools to be made for



each station of an automatic setup to tolerances accurate enough for mass-production interchangeability. *Precision Tool & Mfg. Co., Booth 114.*

For more data circle No. 68 on postcard, p. 151.

Chuck equalizes grip

Rough forgings, out-of-round castings and other irregular surfaces are held tightly by a chuck which compensates for such irregularities. It gives maximum equal gripping pressure on each jaw. As the draw screw is tightened, a cam engages levers, moving the jaws to the work. One jaw makes contact first and stops movement of the

Turn Page

Clark Equipment Company presents the MICHIGAN Series "24"

Model T-24 Truck, 6x4 and 6x6; Model C-24 Crawler Shovel, Clamshell, Crane, Dragline, Hoe

14 Reasons Why—the MICHIGAN Series "24" Is Your Best Buy in '54

Full Vision Cab—new, stylized; all-around and overhead vision—3604 sq. in. glass; comfortable, quiet

Air Controls—clutches actuated by famous MICHIGAN* Air Controls

Power Clutches—single plate, double-disc, multiple-segment—air operated

Primary Drive—power transmitted through two sets spiral bevel gears running in oil

Shafts and Drums—hoist and crowd drums ball bearing-mounted on splined alloy steel anti-friction bearing-mounted shafts

Swing Brake—air operated; standard equipment

Circle Gear Casting—large diameter double-flange one-piece steel casting

Hook Rollers—six 7½" diameter, tapered, adjustable; ball-bearing mounted

Cast Turntable — machinery deck with boom hinge pin bracket and hook roller brackets—single steel casting

Big Brakes—powerful hoist and crowd brakes, 30" diameter

Worm Gear Boom Hoist—independent high speed hoist with automatic safety brake—standard

Removable Counterweight power-handled for easy, quick removal or assembly

Truck Chassis—heavy duty: big engine, transmission, axles; deep section alloy steel frame, cross-braced, welded; rear and center outriggers standard

Crawler Base—one-piece cast steel carbody and circle gear; spring loaded safety brakes; 24" tracks standard

You'll find the MICHIGAN Fact-Folio handy and helpful; contains full specifications, an interesting book "Get More Yardage Through Air Power," and numerous action photos. The coupon will bring yours promptly.

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CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
444 Second Street, Benton Harbor, Michigan

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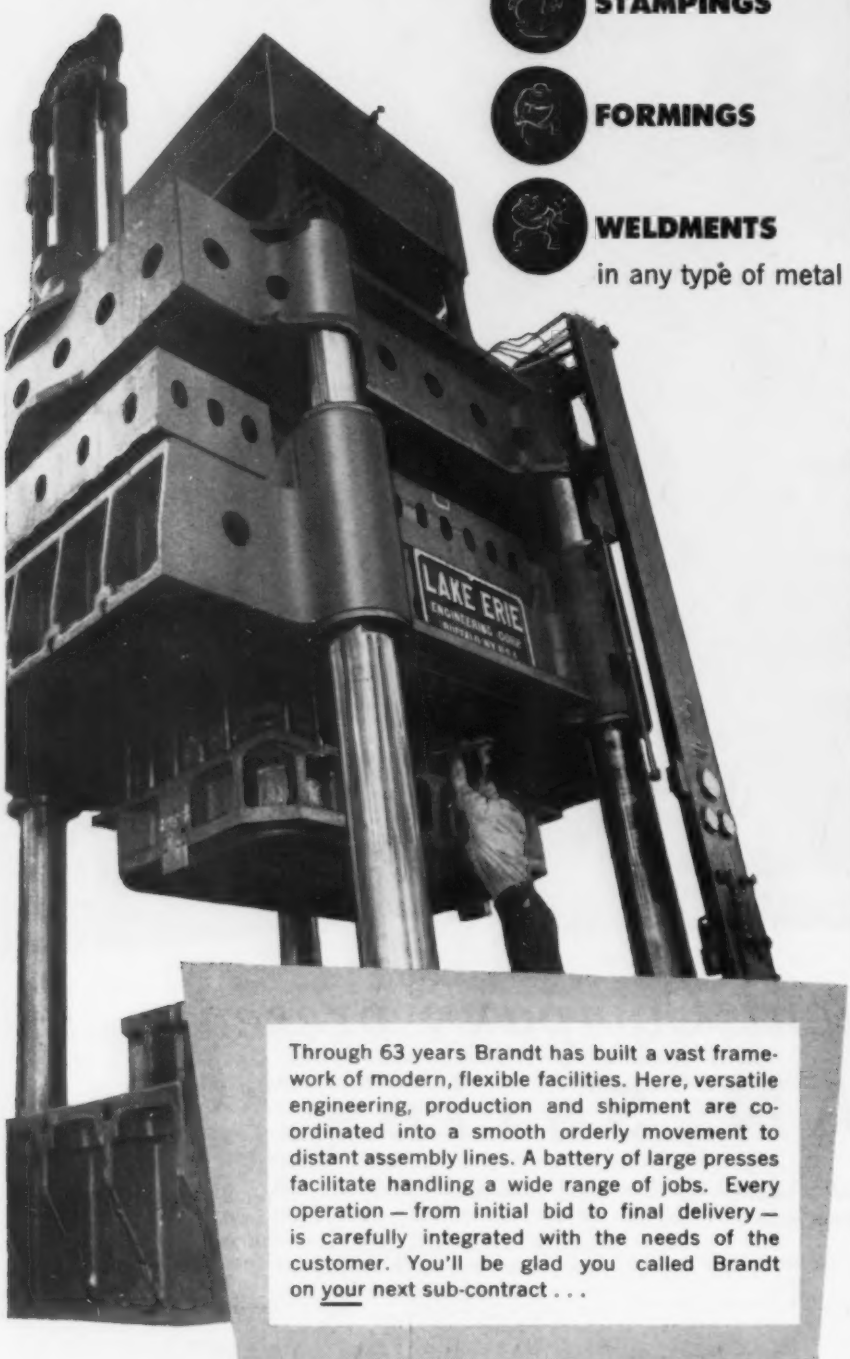
Brandt offers you giants for your mass production job of

STAMPINGS

FORMINGS

WELDMENTS

in any type of metal



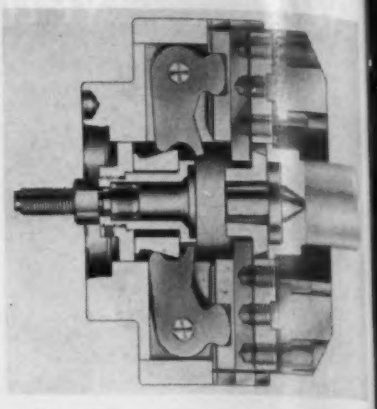
Through 63 years Brandt has built a vast framework of modern, flexible facilities. Here, versatile engineering, production and shipment are coordinated into a smooth orderly movement to distant assembly lines. A battery of large presses facilitate handling a wide range of jobs. Every operation — from initial bid to final delivery — is carefully integrated with the needs of the customer. You'll be glad you called Brandt on your next sub-contract . . .

BRANDT
BALTIMORE

CHARLES T. BRANDT, INC.

Baltimore 30, Md.

—Tool Show Previews—

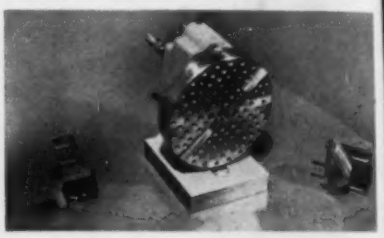


mating lever. The same action applies to the remaining two jaws until each grips equally. *S-P Mfg. Corp., Booth 806.*

For more data circle No. 69 on postcard, p. 151.

Simplifies indexing

Accurate positioning and grinding of square blocks with diameters can be done on a new indexing tool without using centers. Adjustable locators form a nest for position-

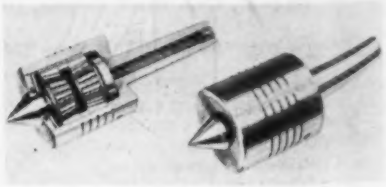


ing tools accurately. By consolidating many practices now used in grinding tools, this indexing unit solves many practical problems. *The Whirl-Dex Co., Booth 1911.*

For more data circle No. 70 on postcard, p. 151.

Broaden work range

Live centers, designed for greater accuracy and higher load-carrying ability, permit work to be done over a wide range. Jobs range from very light turning to loads exceed-



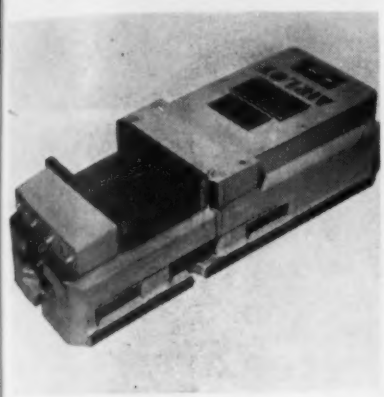
ing 5000 lb. The centers give accuracy in eccentricity within 0.0001 in. and give freedom from gouging, burning, chatter and center point lubrication. *Ideal Industries, Inc., Booth 531.*

For more data circle No. 71 on postcard, p. 151.

Turn Page

Reduces chip clogging

A feature of a new heavy-duty pneumatic vise is the method of removing small chips which work under the movable jaw. The vise is equipped with a chip plate and felts which effectively keep chips out, but

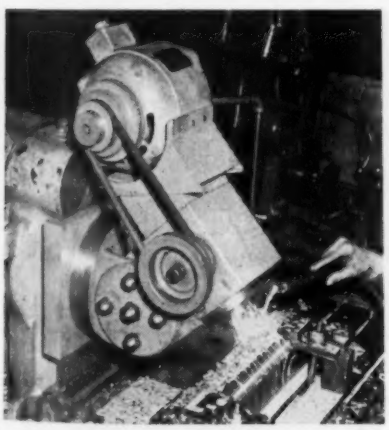


tiny chips are easily and quickly removed by a fast application of grease to the movable jaw. The vise is of rigid construction to securely hold work for carbide milling operations. *Production Devices, Inc., Booth 1971.*

For more data circle No. 72 on postcard, p. 151.

Mill head easily adapted

A self-powered, geared type, milling head adapts standard horizontal milling machines for vertical milling operations. It can be changed quickly from one machine to another and has the extra fea-



ture of spindle adjustment for compound angles. Adjustments are in two planes—parallel to the column face and at right angles to the column face. Three sizes for heavy-duty milling range from ¾ to 5 hp. *Master Mfg. Co., Booth 1454.*

For more data circle No. 73 on postcard, p. 151.

Air vise acts fast

Gripping with a force 15 times the air line pressure, 3-in. wide vise jaws give a positive, fast-acting grip for holding work in drilling, reaming, sawing, grinding and other operations. The vise operates at air pressures up to 150 psi. *Heinrich Tools, Inc., Booth 1646.*

For more data circle No. 74 on postcard, p. 151.

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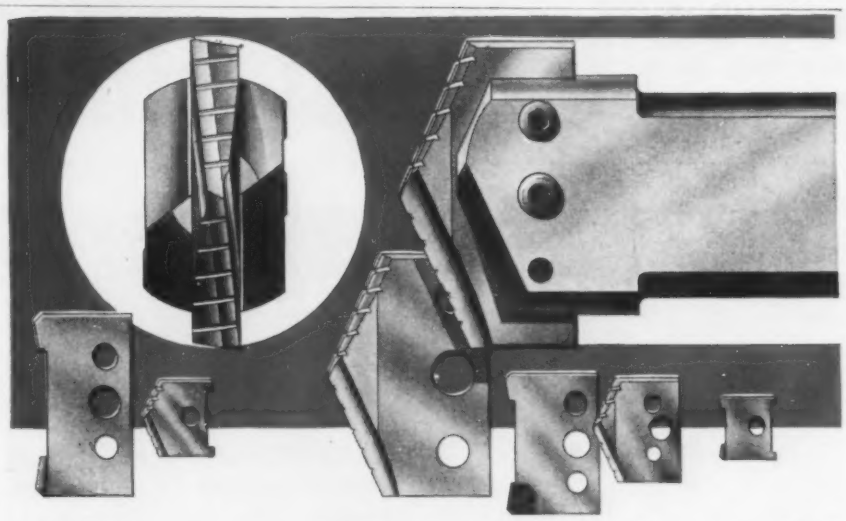
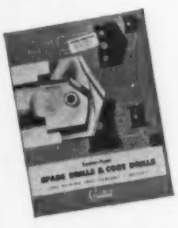


Drill Large Holes from the Solid with Interchangeable Spade Drills

Made in 256 cutter sizes, 1 to 5 inch diameter, in steps of 1/64, Conner type Spade Drills drill the required diameter in one operation, need no retracting to clear them of chips. Only eight sizes of holders are needed to handle all cutter sizes.

For general purpose work and in the Tool Room, use the cutter and holder assembly shown above. It is a rugged tool of great rigidity, recommended for large holes of medium depth.

For Production Drilling (for repetitive work), and for the somewhat deeper holes, use Conner type Oil Hole Holders designed for easy coolant flow and fast chip expulsion.



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For Boring: Core Drill Cutters, for semi-finishing of cored and drilled holes, are made in the same 256 sizes, to fit the same spade drill holders.

The Gairing Tool Company is now the exclusive manufacturer of the Spade and Core Drills, both standard and special, formerly made by the Conner Tool & Cutter Company.

See us Booth 225 at the Tool Show

In Canada: A. C. Wickman (Canada) Ltd., Queensway, Toronto 14

The GAIRING Tool Company

21224 Hoover Road • Detroit 32, Michigan

Saves repair time

Repair kits containing 25 thread inserts of four common sizes can save up to 80 pct in time and cost over conventional maintenance methods. All tools for tapping, inserting and extracting are included in the kit. Repaired threads are stronger and more durable than the original threads. Loading strengths are at least 25 pct greater in all materials. Threads are also more resistant to wear, vibration, seizing, galling and corrosion. *Heli-Coil Corp., Booth 713.*

For more data circle No. 75 on postcard, p. 151.

FRAY TOP SLIDES
DOUBLE MILLING RANGE
Fray NO. 10RH MILLING MACHINE
UNIVERSAL RAM • TURRET TYPE
• VERTICAL & HORIZONTAL
A Fray pays bigger production dividends by performing an unequalled range of milling operations. Both of the top slides on the Fray 10 RH are easily adjustable. This feature permits alignment of the turret slide with the table, thus doubling longitudinal and cross milling range . . . or you can just as simply set the turret at an angle to the table and mill in two directions. Combined, the turret slide and table slide provide 38" of overall travel, while the table cross slide, plus the ram slide permits a full 18" of in-and-out adjustment. This equals the overall range of much larger machines. Fray moves precision work faster at less cost.
Fray "All-Angle" Head TYPE 4
For deep, heavy cuts. Permits working to extra close limits. Any angle up to compound 2-way. Request Bulletin 4.
Overall Height 7 Feet
Write for details and specifications . . . Request Bulletin # 10
All-Angle
FRAY MACHINE TOOL CO.
2935 NO. ONTARIO STREET, BURBANK, CALIFORNIA

Attachment fits any press

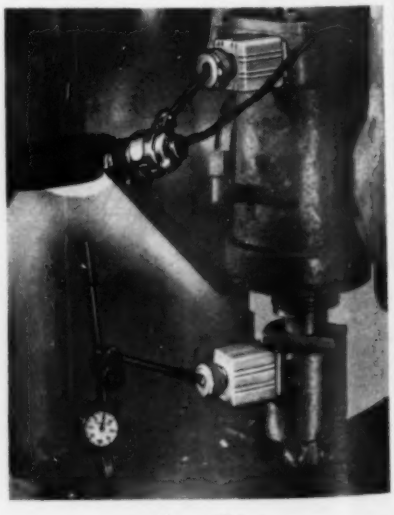
An electrically controlled automatic lead screw tapping attachment which fits any drill press can handle all types of production and precision tapping in the range of

No. 0 to ¾ in. Simple electrical controls permit quick, easy selection of action for a particular operation. The unit is rugged, lightweight and self-contained in a compact body. *Commander Mfg. Co., Booth 823.*

For more data circle No. 76 on postcard, p. 151.

Solves many problems

A magnetic base holder which can be mounted instantly to flat or down to ¾-in. round surfaces solves adjustment problems often regarded impossible. Called Tiny Titan, it has holding power of 65 to 125 lb. It is a precision instru-



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HERE'S PROOF: You can always count on Continental for every fastener need!

Continental Controls Every Phase of Fastener Production!

. . . to guarantee you better quality

From wire drawing to shipping, Continental controls every phase in fastener production under its own roof. Even the tools used are made in the plant. Every step beginning with the design engineer is carefully supervised and checked to insure the finest product possible. Their unequaled Quality Control System is constantly working to protect you.

Whenever special or standard fasteners are being considered, remember that quality production is assured at Continental—it is not just a term—but a rigid policy of perfection.

Call us today or check your nearest Continental distributor for information. You'll get complete control in every step . . . backed by 50 years of fastener experience.

Manufacturers of HOLTITE Fastenings

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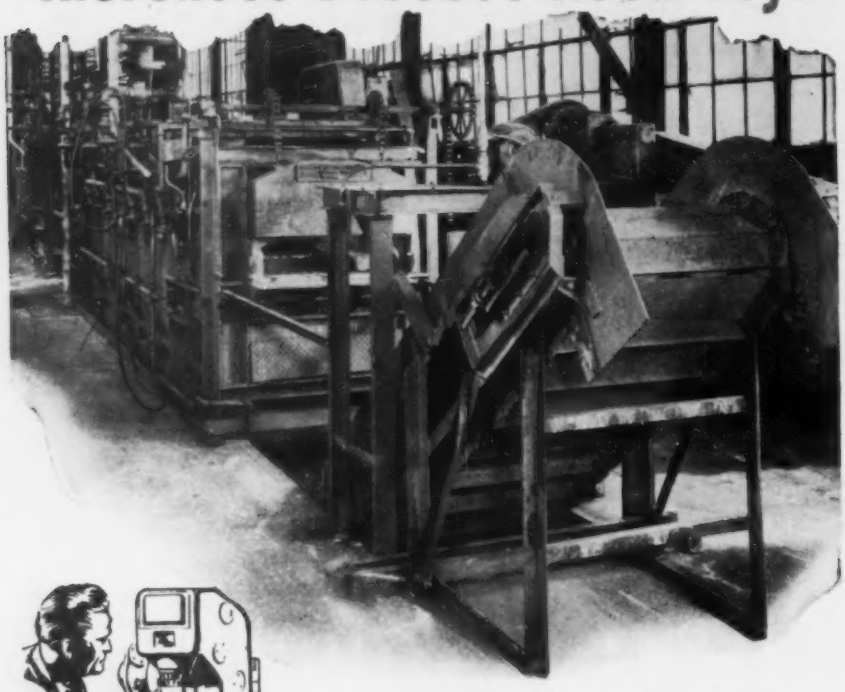
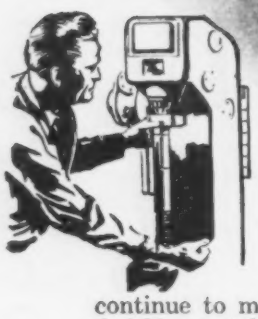
50th Anniversary

CONTINENTAL SCREW COMPANY

New Bedford, Mass., U. S. A.

New Unitcast Equipment Increases Process Accuracy!





. . Cuts Heat Treat Costs!

Installation and operation of continuous processing equipment in Heat Treating is another reason Unitcastings continue to maintain top quality with potentially *lower finishing costs!*

Practical use of this continuous method eliminates three of four variables common to multiple production heat treating. By eliminating *all* handling-in-process, labor costs are substantially reduced . . . and the human "margin of error" is removed. Concentrated processing of each casting is better accomplished by this method and heating, quenching and drawing time are accurately controlled. Subsequently the desired degree of hardness is held in closer range. Uniform machinability is the net result and your *final costs* are definitely *lower*. "Maintained accuracy" in Unitcastings is a provision of top quality!

Perhaps your finished costs are being held up by inaccuracy! Let Unitcastings solve this . . . and perhaps other problems, too. Write or call today for estimates and suggestions . . . no obligation!

UNITCAST CORPORATION • Toledo 9, Ohio

In Canada: CANADIAN-UNITCAST STEEL, LTD., Sherbrooke, Quebec

Unitcast

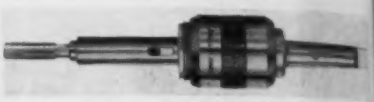
QUALITY STEEL CASTINGS

ment for holding gages, indicators, lights, magnifiers and other instruments requiring a base. *Enco Mfg. Co., Booth 527.*

For more data circle No. 77 on postcard, p. 151.

Reduces tap breakage

Adjustable torque and a full-releasing roller driver are features of a new Safe-Torque tap driver. The unit, using a new application of the roller-driver principle, releases com-



pletely without friction, heat and wear. When driving torque exceeds a preset limit, based on tap strength, the driver shell expands and the drive is released. *Scully-Jones & Co., Booth 1530.*

For more data circle No. 78 on postcard, p. 151.

Presets jaw opening

Set-up time is reduced drastically by the use of a conventional vise screw to preset the jaw opening of power-operated vises. The power unit, which is attached to a conven-

tional vise, has a stroke of 0 to ¾ in. Low air pressure actuates the air-hydraulic convertor. The vise meets safety requirements. *Wilton Tool Mfg. Co., Booth 804.*

For more data circle No. 79 on postcard, p. 151.

Turn Page

AJAX PRESSES FOR FINE FORGINGS

AJAX development engineers
sting experimental dies,
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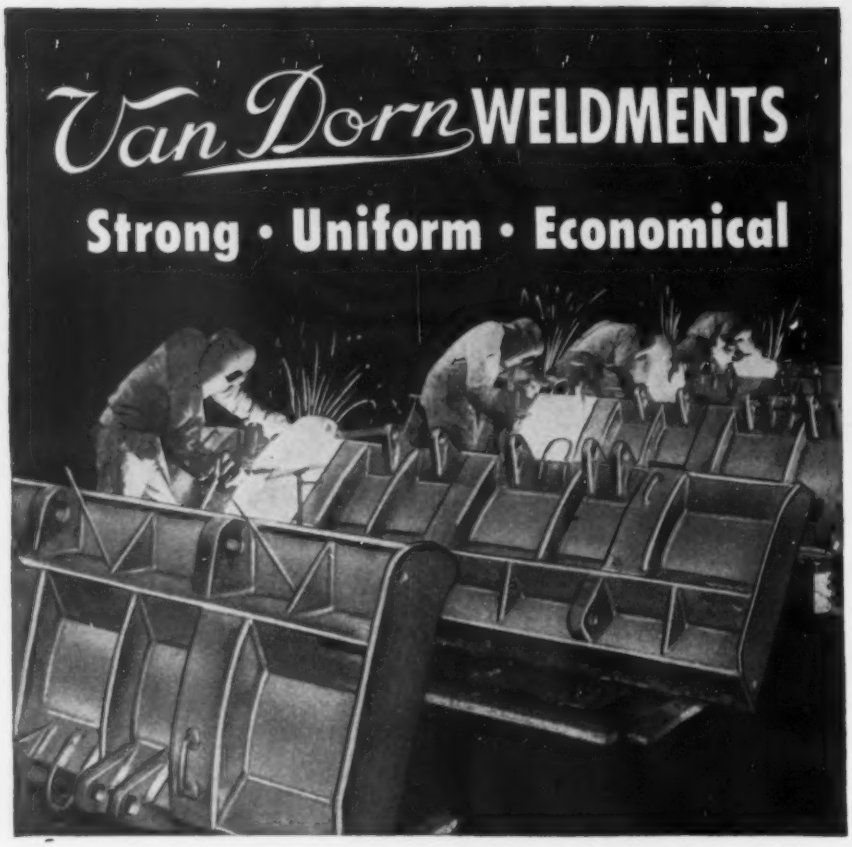
Van Dorn WELDMENTS

Strong • Uniform • Economical



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Profusely illustrated; describes the many advantages of weldments, and Van Dorn's extensive facilities.

• You can rely on Van Dorn Weldment fabrication because we have complete production facilities . . . experienced design engineers . . . specially trained workmen . . . 80 years' experience in metal working.

Consult us about your requirements—no obligation, of course. The Van Dorn Iron Works Co., 2685 East 79th Street, Cleveland 4, Ohio.

THE Van Dorn IRON WORKS CO.

2685 East 79th Street • Cleveland 4, Ohio

Tool Show Previews—

Increases bearing surface

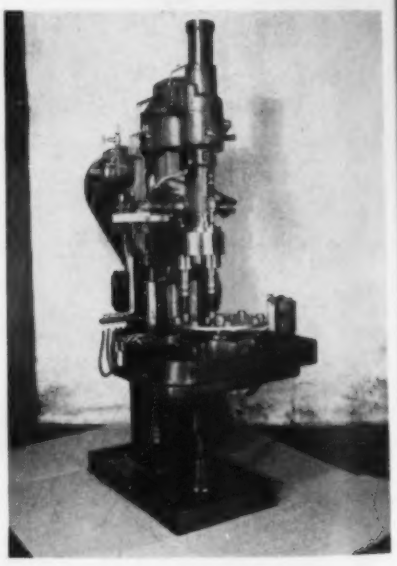
Newly designed clamps with hardened bushings which run through the clamp bars give a larger and better bearing surface.

Deep serrations assure a positive lock in position. They also reduce wear to a minimum and provide accurate snap action. *Detroit Stamping Co., Booth 440.*

For more data circle No. 80 on postcard, p. 151.

Quick changeover

Accurate control and high production rates in single or multi-spindle tapping and drilling operations are assured in a single head hydraulic combination drilling and tapping unit. Installation of a lead screw assembly and a few minor



adjustments change it from an automatic drilling unit to an automatic tapping unit. Twelve forward speeds range from 236 to 1328 rpm for tapping with an extra range to 2000 rpm for drilling only. *Kaufman Mfg. Co., Booth 1634.*

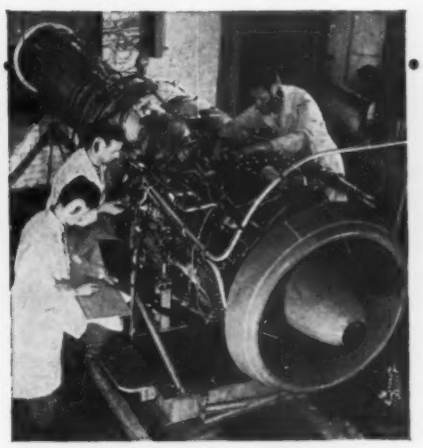
For more data circle No. 81 on postcard, p. 151.

Turn Page

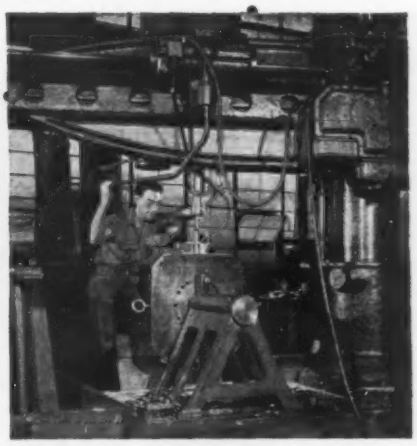
MAKE IT ALLOY

Versatile, dependable Chromium Steels are doing more different jobs today than ever before.

Constructional Alloy Steels—For greater strength and hardness in crankshafts, springs, transmission gears, countershaft pins, sway eliminator bars, through-hardened bearings and other critical parts, much of the alloy steel used by makers of automotive and farm equipment now contains chromium.



Stainless Steels—Every well-known type of stainless—both straight chromium grades and chromium-nickel grades — owes its resistance to heat and corrosion primarily to chromium.



Tool Steels—Whether for cutting, hot and cold forming, or die casting, whether the end product is a hand chisel or a forging die, nearly every present-day type of tool steel gets much of its strength and hardness from chromium.

The finest alloy steels are made with Vancoram ferro alloys.

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.

DETROIT • CHICAGO • PITTSBURGH • CLEVELAND

Make it better...make it alloy

VANCORAM BRAND

Producers of alloys, metals and chemicals

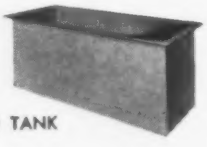
get the best out of your tool steel through

PROPER DRESSING

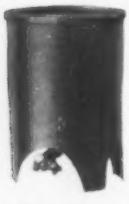
FORGING HAMMER

FORGING FURNACE

POT FURNACE



QUENCH TANK



TEMPERING FURNACE

TOOL GRINDER

Here is a "Package" that will get rid of a costly and annoying problem . . . In fact, it will save up to 60% of costs for cutting and chipping tools . . . the best life is gotten out of today's steels through proper dressing . . . proper steel, properly treated, will reduce costs substantially. Now, at your own convenience, you can dress as many tools as are needed, and keep close control of your tool inventory.

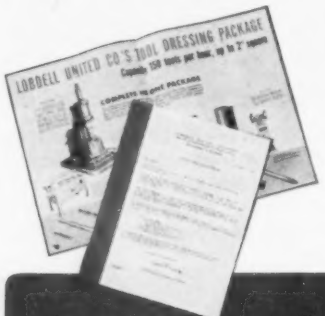
The complete "Tool Dressing Package", entirely engineered by LOBDELL UNITED CO., (subsidiary of United Engineering and Foundry Co.) . . . includes all of the Forging, Heat Treating and Dressing Equipment . . . plus, the practical methods needed . . . and this "Package" not only reduces inventory costs, but it can do this at *low initial* cost, recoverable nominally in one year . . . without special metallurgical control.

The "versatile" NAZEL Electro-Pneumatic Forging Hammer is the LOBDELL UNITED CO. product . . . For the additional equipment presented within this "Package", LOBDELL is joined by a group of the most reputable leaders in their fields:

Heating Equipment by Eclipse Fuel Engineering Company

Tool Grinding Equipment by Black and Decker Company

Accessory Tools and Tool Steels by Bedford Tool and Forge Company



A copy of LOBDELL's new "Tool Dressing Package" Bulletin will give you further details.

LOBDELL UNITED COMPANY

1836-1954 WILMINGTON 99, DELAWARE

A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

—Tool Show Previews—

Faster precision tapping

Higher production in tapping operations is possible with a new lead screw tapping head. The new Auto-Tap head features a rapidly interchangeable lead screw, a new type cone clutch reversing mechanism, and positive depth control to assure perfect threads even in blind or recessed holes. The tap withdraws faster, the floating workpiece is positioned rapidly and operator fatigue is reduced. *Automatic Methods, Inc., Booth 1909.*

For more data circle No. 82 on postcard, p. 151.

Testing, Inspection:

Drive for greater precision aided by new gaging devices.

Serves dual role

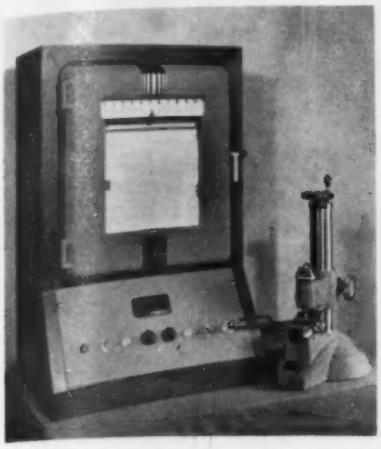
A dual purpose optical instrument recently designed may be used both as an optical form grinder projector and as a conventional universal type optical comparator. A new long focal length multiphase

optical system is used. Eight lenses to provide magnifications from 10X to 100X are obtainable as standard equipment. Light source is blower cooled. *The Portman Instrument Co., Inc., Booth 2155.*

For more data circle No. 83 on postcard, p. 151.

Aids statistical control

Individual readings on comparator checked production parts are automatically recorded on a newly designed unit. The recording unit has been designed to work with any standard pickup head used on the

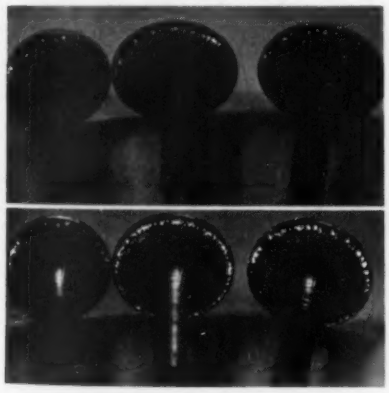


company's electronic comparators, height gages, or special electronic checking fixtures. Standard units may be plugged into the front of the recorder cabinet by means of a jack similar to a phone jack. *Merz Engineering, Inc., Booth 306.*

For more data circle No. 84 on postcard, p. 151.

More sensitive penetrant

Greater sensitivity is reported with the new Zyglo-Pentrex fluorescent penetrant inspection material. Advantage over previous penetrant inspection methods is its ability to find both very tight cracks and broad, shallow defects. Nor-



mally only the middle range of defects are shown as in these diesel valves (top) refaced with high alloy welding material. All defects show up (bottom) using Zyglo-Pentrex. Emuslifier is added, after penetration, by a separate dip. *Magnaflux Corp., Booth 704.*

For more data circle No. 85 on postcard, p. 151.

Gage centerless grinding

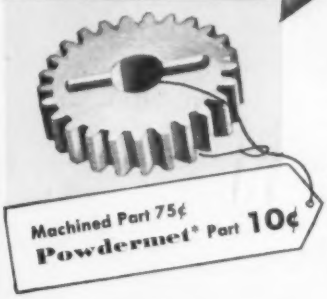
Better adherence to centerless grinding tolerances will be possible with a new gage built from Air-O-Limit gaging components. Gaging

Turn Page

DON'T CUT PARTS ...Cut Costs!

Why pour money into expensive machining operations?

POWDERED METAL PARTS can do the job for *much less!*

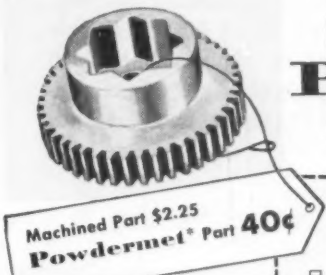


Tough, intricate parts ready for assembly without further processing—at *savings of up to 600% over identical machined parts!* No wonder industry chooses Powdermet.*

Low-cost PM parts are die-pressed to close tolerances, have excellent wearability, and a wide range of alloys are available—many exceeding the tensile strengths of mild steel. Through controlled porosity and electrical permeability, many special properties are achieved . . . such as oil-impregnation for life-time self-lubrication. That's why Powdermet* parts are often the *best parts possible* for gears, bearings, filters, etc.

At Yale & Towne, years of experience and technological know-how in powder metallurgy back up every recommendation on PM parts for *your* particular application.

The world's most famous key
. . . symbol of industrial leadership!



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MANUFACTURING COMPANY
PMP *Powdered Metal Products Division*
9335 Belmont Avenue • Franklin Park, Illinois

Visit us at the Basic Materials Show, Chicago, May 17-20. Booth 133.

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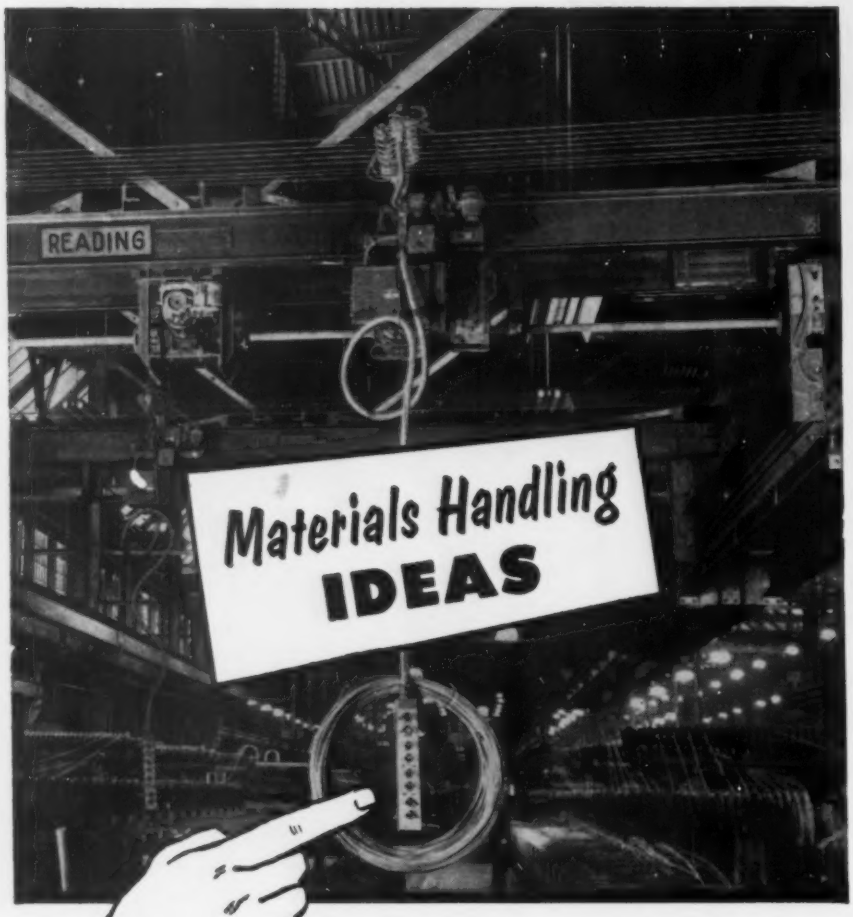


At the Touch of a Button

...FASTER HANDLING, LOWER COST

● Here's how a typical plant turned a slow, costly handling job into a simple push-button operation. Consider the savings you might get in time, money and manpower by following a similar step.

The job was to remove wire from winding drums and convey it to the next operation. To reduce costs, a new idea was tried: a ½-ton, single I-BEAM READING ELECTRIC CRANE was custom-built for the job. All motions were motorized. Now one man controls the entire operation faster and more economically—by simply pushing the right button!

If you, too, are looking for a way to speed up your own materials handling, and save money doing it, here's the step that can pay off for you. Simply get in touch with READING. At no obligation, one of our engineers will gladly analyze your handling requirements and give you a practical recommendation for obtaining the results you want. A note on your letterhead will put him to work.

Reading Crane & Hoist Corporation, 2101 Adams Street, Reading, Pa.

READING CRANES

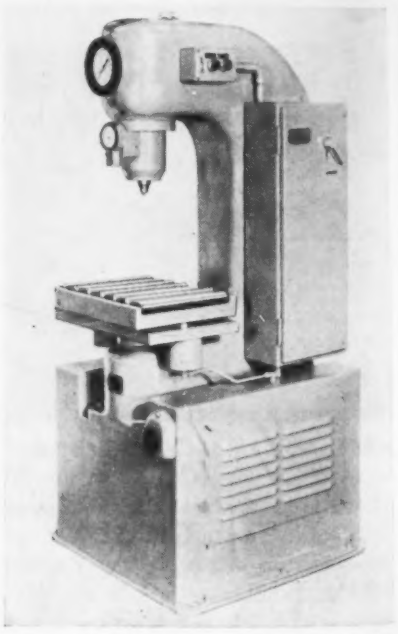
CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

circuit is the standard back pressure gaging system. An "over and under" Light Signal Unit uses relays and switches which operate on a few millionths of an inch dimensional change. Control limits can be pre-set. *Pratt & Whitney Div., Niles-Bement-Pond Co., Booth 1531.*

For more data circle No. 86 on postcard, p. 151.

Hardness testing speeded

A production type Brinell hardness testing machine that fits into a roller conveyor line facilitates parts handling and speeds output. A roller conveyor section allows the operator to roll the part in position. As the test cycle begins, the rollers drop out of the way, allowing the work to rest on an anvil of hardened rails. Rollers automatically rise again at end of test. *Steel City Testing Machines, Inc., Booth 1316.*



For more data circle No. 87 on postcard, p. 151.

Turn Page

STOP MAN-HANDLING SHEET STOCK

IN WAREHOUSES...
in LARGE or SMALL plants

You can save up to 90%
in Handling Time . . .
up to 50% in Floor Space
. . . and Eliminate
Damage to Stock with an

ACME
SHEET STOCK
HANDLING SYSTEM*

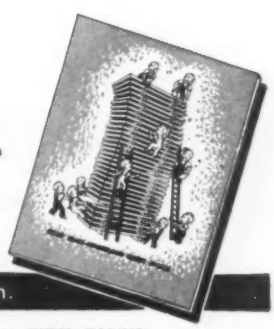
*PATENT APPLIED FOR

Manufactured by SOLE LICENSEE

Acme WELDING

Here's How...

Write today for your FREE copy of our new illustrated booklet to 1044 New Britain Avenue.

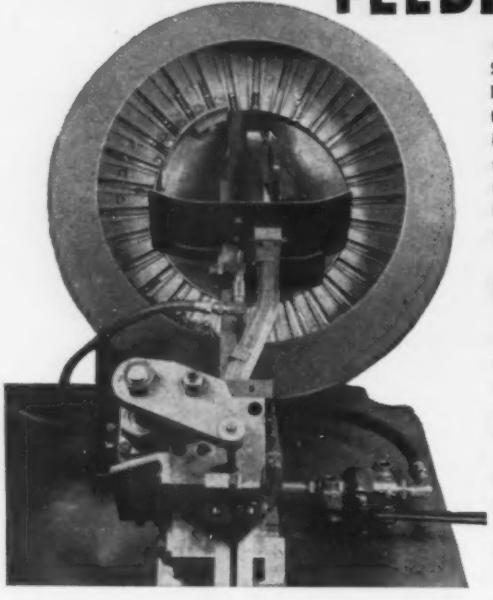


DIVISION of THE UNITED TOOL & DIE CO • West Hartford 10 • Conn.

CUSTOM FABRICATORS of PRESSURE VESSELS • MACHINERY BASES and COMPONENTS • WELDED ASSEMBLIES • STEEL TANKS

National Representative TRANSMISSION EQUIPMENT CO., Inc. • 441 LEXINGTON AVE., NEW YORK 17, N. Y.

Use DPS SELECTIVE FEEDING DEVICES



● Note the improvement in Lower Costs, Speedy Production, Quality Control and Increased Profits . . . Now, this DPS contribution to the metal-working industry is emphasized in an expanded line of selective feeding devices and engineering service . . . Tell us your requirements; we have the unit and the know-how to meet your needs.

DPS BARREL-FEEDER

● Here is an interesting case showing separate screws and lock washers that were loaded into a single feeder and ejected loosely assembled at the rate of 60 to 70 a minute . . . An amazing speed increase over slow, manual operation. In this instance, as in thousands of other applications, the unit was designed with the idea of maximum feeding of a wide variety of parts at a fraction of the cost of manual feeding.

DPS BOWL-FEEDER

Our Newest Addition

● An electric, vibrating unit that advances the parts on a circular spiral, aligning and correctly locating them to issue directly into the work area in proper time cycle. Provides fully automatic feeding of light, fragile parts that normally could not withstand tumbling.

Let us diagnose your symptoms and prescribe the proper remedy. Write for details.

DETROIT POWER SCREWDRIVER CO.

2811 W. FORT ST. DETROIT 16, MICH.

VISIT OUR BOOTH NO. 145, A. S. T. E. SHOW, PHILADELPHIA, APRIL 26 TO 30

—Tool Show Previews—

Air bore gage adjustable

An inexpensive, lightweight adjustable air bore gage will check any bore accurately within the range of 3 to 12 in. using a Plunjet air gaging cartridge. The bore gage kit consists of a body, two carbide

tipped screws, four extensions and two centering bars having carbide balls as contact points. The gage is self-centering and needs only to be rocked to find the true diameter. No setting rings are required. *The Sheffield Corp., Booth 325.*

For more data circle No. 88 on postcard, p. 151.

Magnification: 5000 to 1

A 5000 to 1 magnification is obtained with an air gage calibrated to read to 0.000020 in. directly rather than to "Go—No Go." Only one master is required to set the Dimensionair gage. Attachments which may be used with the gage

include the Arnold Grinding Gage and the AirProbe. The AirProbe features extra-long range, 0.003 to 0.030 in., with overtravel from 0.70 to 0.100 in. *Federal Products Corp., Booths 315-321.*

For more data circle No. 89 on postcard, p. 151.

Turn Page

Just as a catcher needs protection . . .

IRON and STEEL *Need* PROTECTION

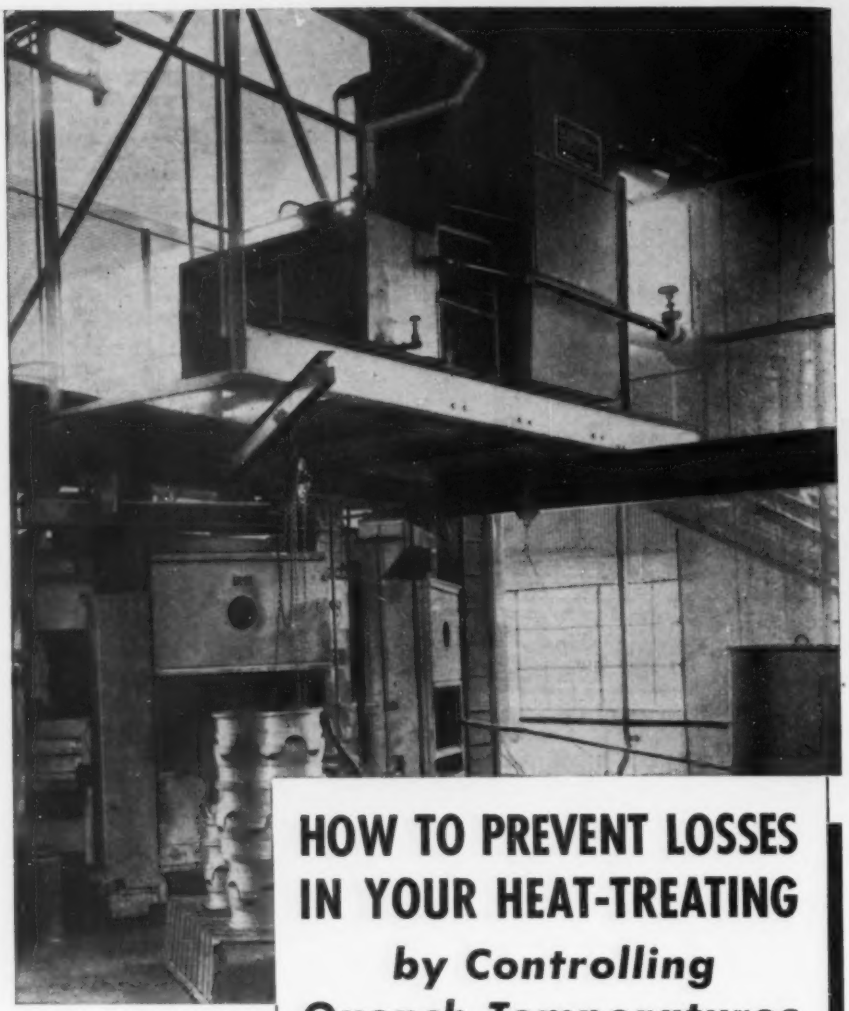
If your product is made of iron or steel, and exposed to the elements, protect it against the ravages of rust by Hot-Dip Galvanizing — the best possible rust preventive when applied by Hanlon-Gregory. For longer life, greater uninterrupted service and substantial savings in maintenance, specify Hot-Dip Galvanizing . . . SEAL IT IN ZINC.

HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania

The World's largest Job Galvanizing Plant

galvanizing . . . pickling . . . painting . . . oiling



HOW TO PREVENT LOSSES IN YOUR HEAT-TREATING

by Controlling Quench Temperatures

● Using Niagara's AERO HEAT EXCHANGER to cool your quench bath never fails to give you real control of the temperatures at which you wish to quench.

Your experience will be the same as others who have installed this method. You'll get better physicals; save losses and rejections; increase heat-treating capacity and production with lower costs. You can put back heat into the quench bath to prevent the losses of a "warm-up" period. You remove heat at the rate of input and prevent flash fires in oil quench baths.

You'll save space in your heat treating department and get a more productive arrangement because less room is needed for coolers and tanks. You'll find savings in piping, pumping and in the amounts of oil you will have to buy. And the saving in the cost of cooling water alone is enough to repay the cost of the Niagara Aero Heat Exchanger, usually in less than two years.

Write for Bulletin 120 and further information

NIAGARA BLOWER COMPANY

Dept. IA, 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

INDUSTRIAL COOLING HEATING • DRYING

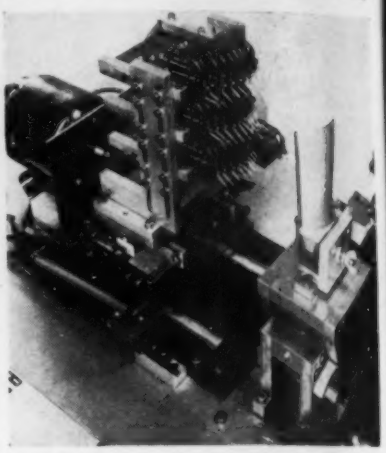
NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

—Tool Show Previews—

Probe gives fast reading

Intricate parts such as turbine blades, gears, and cams, can be measured with an automatic inspection gage using electric probes. The Probograph also automatically supplies a graph reading. Magnification ratios range from 10:1 to 800:1. The unit can be operated by

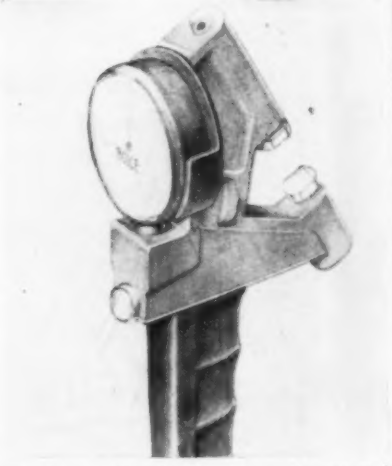


pushbutton and control levers or automatically cycled. Any high-precision job, ranging from minute watch parts to sizable aircraft engine and other components, may be handled on the several models. *Industrial Scientific Co., Booth 135.*

For more data circle No. 90 on postcard, p. 151.

New dial snap gage

Flat parallel anvils permitting gage measurements to be taken close to shoulders are available on a new dial snap gage. A 5 to 1 magnification of anvil travel can be



read on the indicator. Overtravel on the movable anvil prevents indicator jamming. Built-in balance reduces operator fatigue. *Boice Manufacturing Co., Inc., Booth 341.*

For more data circle No. 91 on postcard, p. 151.

Turn Page

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FOR INDUSTRIAL
ACCIDENT PREVENTION

"Signs Since 1903"

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JOBS WANTED

I'm a high pressure triplex pump built for the toughest hydraulic power application you have. Pick the worst, give it to me, and you can forget you ever had a problem. Top references furnished.

Dear Sirs:

I'm a high pressure triplex pump built originally to work in the oil fields. Have served there 20 years in more than 1,000 jobs. Normally run 24 hours a day and frequently go a week or more without ever being looked at.

Have found this ruggedness pays off BIG in metal extruding, rubber molding, metal forming, and in various process applications.

My specialty is high pressure power (1,000 to 20,000 psi) and will deliver it with virtually no maintenance cost or down-time. If you need a hydraulic power source you can install and forget, why not check my references?

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TRIPLEX PUMP

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Gentlemen:
Please send me complete information on KOBE Triplex Pumps.

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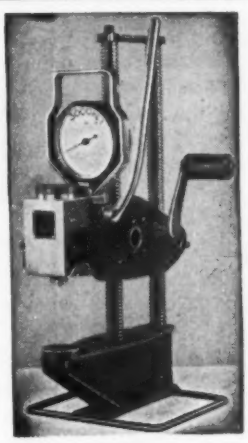
THE KING PORTABLE BRINELL

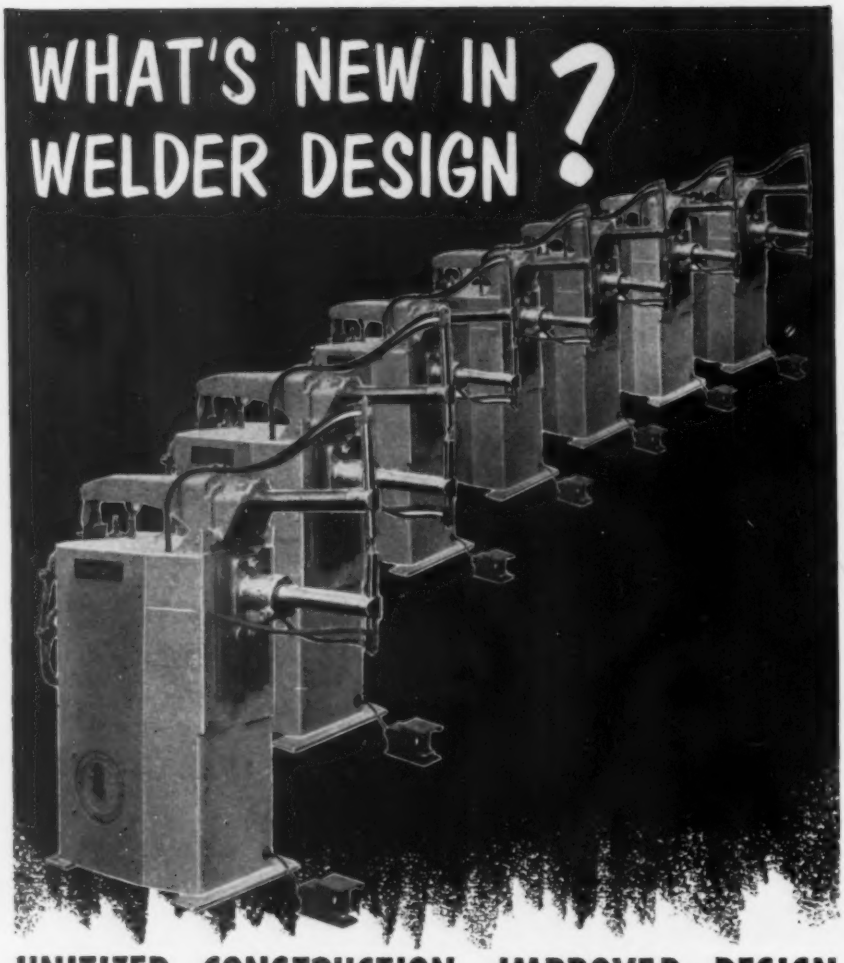
A hardness tester particularly adapted for use on CASTINGS and FORGINGS

Puts an actual load of 3000kg on a 10mm ball.
Throat, 4" deep.
Gap, 10" high.
Weight, 20 lbs.
Can be used in any position—even upside down.
Equally accurate as portable or stationary equipment.
Test head removable for testing larger pieces beyond the capacity of the standard base.



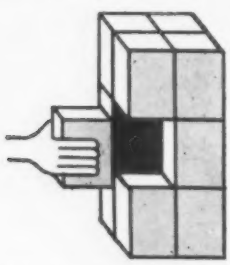
ANDREW KING
Box 606, Ardmore, Pa.

WHAT'S NEW IN WELDER DESIGN?



UNITIZED CONSTRUCTION, IMPROVED DESIGN of Federal's Rocker-Arm Spot Welder MEANS BETTER WELDS, FASTER, LOWER UPKEEP

UNITIZED DESIGN
A Federal Exclusive!



Component parts of each system are sectionized and mounted on individual, removable panels. Normal "down-time" is reduced to an absolute minimum; maintenance greatly simplified.

Federal's New Rocker Arm Spot Welders—redesigned from base to tip—to deliver highest production with a minimum of operating and maintenance costs. Feature for feature they are the outstanding low cost spot welders of this type available today.

Here's a few of the many features: Unitized Design, built in sections for easy maintenance and interchangeability; More Space, tapered frame permits greater working areas; Compact Construction, trims bulk—all lines are outside frame—easily accessible without unsightly and dangerous protrusions; Ferrule Fittings, with threaded couplings, permit quick, simple disconnect of all water and air connections; Low Loss Cylinder of new design boosts efficiency as does the new style Low Inertia, streamlined Horn Raising Lever. It's all new! It's welding efficiency at it's finest. It's another reason why welding engineers trust "Federal—First in Resistance Welding."

See Federal at Booths
172-173, Welding Show
May 5-7, Buaffalo, N. Y.

Federal® WELDERS

Warco® PRESSES

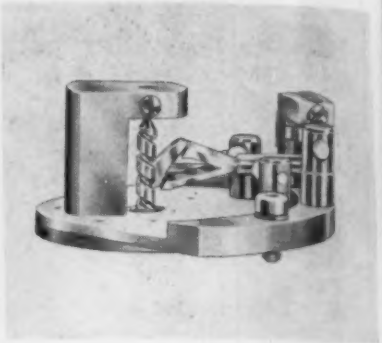
THE FEDERAL MACHINE AND WELDER COMPANY

WARREN, OHIO

—Tool Show Previews—

Design reduces wear

Elimination of accumulative errors due to wear of internal parts was sought in designing this dial indicator mechanism. For indicators subject to unusual shock or strain, 0.030-in. overtravel permits the indicator to arrive at the stop



position while the mechanism continues 0.030 in. beyond. Solid nylon hand stop pins damp shock. A step-down dial brings the scale and pointer to the same plane for easy reading. *Nilsson Gage Co., Inc., Booth 202.*

For more data circle No. 92 on postcard, p. 151.

Portable Power Tools:

New designs underscore trend to wider use of small power tools.

Band saw saves time

A completely portable electric metal-cutting band saw, weighs only 16 lb. The metal-cutting saw is light enough to be used free-hand in any position. Stock-cutting

capacity, up to 3¼ x 4¼ in., equals a large hack saw. A powerful motor eliminates fatigue, makes a cleaner, more accurate cut on ferous and nonferrous metals. *Porter-Cable Machine Co., Booth 1324.*

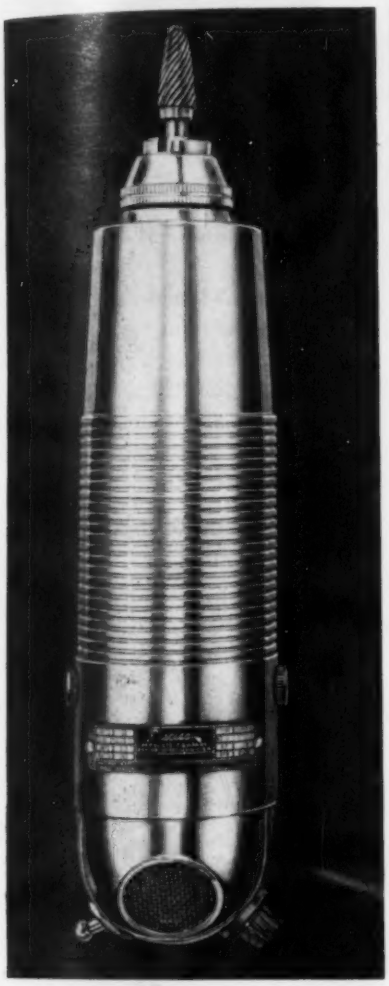
For more data circle No. 93 on postcard, p. 151.

Turn Page

—Tool Show Previews—

Has wide speed range

Round the clock production or toolroom setups are served equally well with a new heavy duty grinder-miller. Used with special machine tool mounts, the Precise Super 50 may be set up accurately and quick-



ly in lathes, milling machines, surface grinders and drill presses. The unit is powered by a universal electric motor which provides ¼ hp at the quill. Speeds from 15,000 to 45,000 rpm are available. *Precise Products Corp., Booth 828.*

For more data circle No. 94 on postcard, p. 151.

Profiling carbide dies

Tungsten carbide dies can be machined using the new Nord Di-Profiler. Operation is unusually smooth, even when used at long stroke which may be adjusted from 0 to 0.250 in. Full ball bearing construction has been used. Action is reciprocating and oscillating as desired. When used with the spindle

Turn Page

Precision Gears
in quantity-at competitive prices!

PERKINS GEAR ENGINEERING SERVICES extend from coast-to-coast. Hence, no matter where you are located, we will gladly—and promptly—furnish estimates on your requirements for custom-made gears, and consult with you on the possibility of obtaining a more economical and highly efficient source of supply for the precision gears you require.

We do not manufacture stock gears. But once your specifications are in our files, re-orders are filled promptly—*and delivered on time.* We are equipped to produce gears in any quantity, any type, any material, metallic or non-metallic.

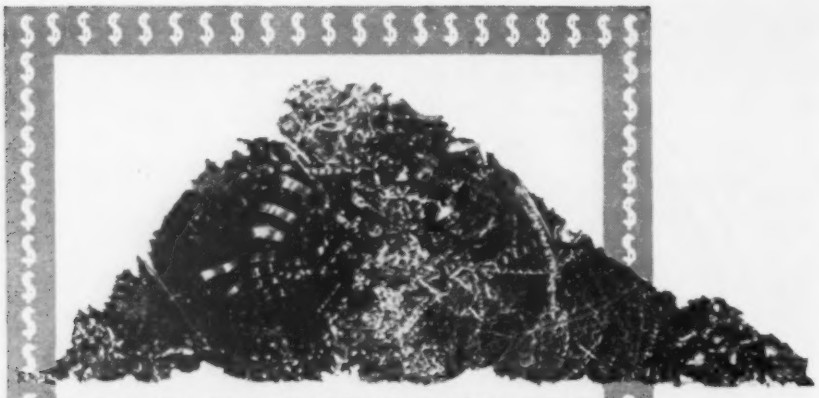
Let us present our conception of a modern and *mutually* advantageous gear engineering service. No obligation of course.

YOU FURNISH THE SPECIFICATIONS, WE'LL PRODUCE THE GEARS!

PERKINS MAKES: helical gears, bevel gears, sprockets, ratchets, worm gears, spiral gears, spur gears with shaved or ground teeth, ground thread worms.

NOTE: The PERKINS PRECISION SPRING COILER is the latest development in the spring coiler field and eliminates entirely the use of arbors and long set up time. It is a complete self-sufficient machine and enables you to make the spring you want when you want it—in seconds. The coiler produces any type of spring, in any diameter and any pitch with this range: Wire sizes .005 to .125. Diameter, from 3/32" to 12" and larger. Size of the compact coiler is only 7½ x x 16". A POWER MODEL mounted on a welded steel console cabinet base is also available. Full information on request.

PERKINS
MACHINE & GEAR COMPANY
WEST SPRINGFIELD, MASSACHUSETTS



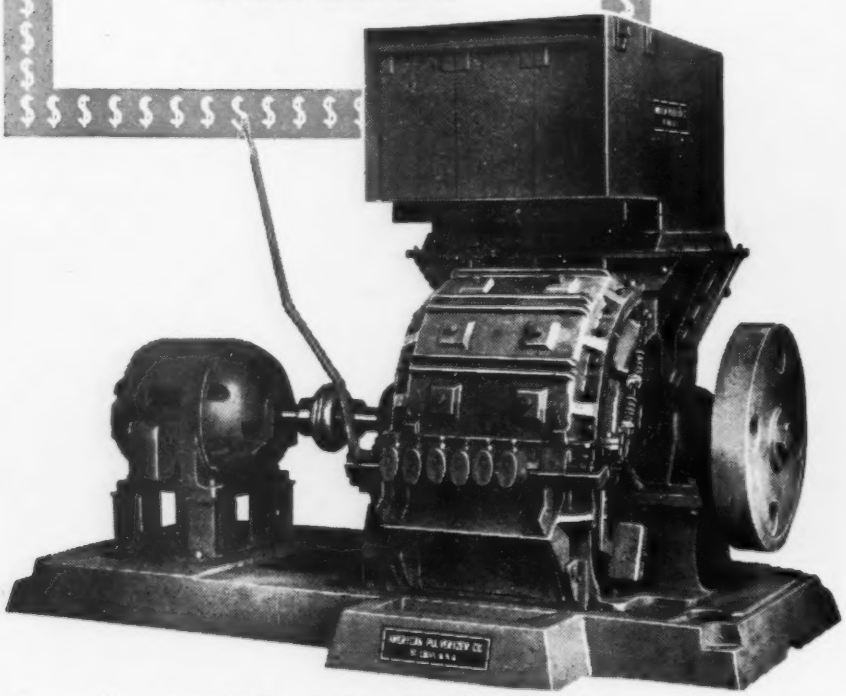
THERE ARE EXTRA DOLLARS IN THIS SCRAP PILE!

...when you install an

American

METAL TURNINGS

CRUSHER



Pays for itself in 3 Profitable Ways:

1. **TOP SCRAP VALUE.** Uniform short shoveling turnings produced by an American bring up to $4 per ton more than regular machine shop turnings.
2. **INCREASED CUTTING OIL RECOVERY.** Up to 50 gallons per ton are released from turnings reduced in an American.
3. **EASIER HANDLING, STORAGE.** American-reduced turnings require but a fraction of the usual storage space.. are easily briquetted.

Available in 1 to 10 tons per hour capacities to meet your needs. WRITE today for the complete American profit story.

American

PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1439 MACKLIND AVE. • ST. LOUIS 10, MO.

—Tool Show Previews—

attachment, finely controlled rotary action is obtained. *Nord International Corp., Booth 2059.*

For more data circle No. 95 on postcard, p. 151.

Air tool cuts costs

Streamlined for easy handling and minimum weight, a new lightweight grinder helps cut grinding costs on toughest jobs. The one piece spindle is supported by three bearings. All bearings are double

shielded. Steel rotor has been designed for long life. Threaded steel inserts are used for all cylinder and handle bolts. Air strainers, lubricator and oil reservoir are built in. *Rotor Tool Co., Booth 1246.*

For more data circle No. 96 on postcard, p. 151.

Cleaning and Finishing:

New methods, improved equipment find wide acceptance.

Brushing done automatically

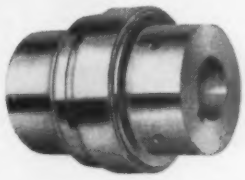
A new power brushing lathe for removing burrs, blending surface junctures and doing other brushing jobs handles work pieces up to

Turn Page

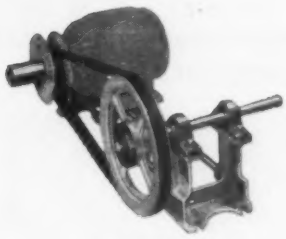
LOVEJOY
Power Transmission Equipment

Economical In Cost
•
Easily Installed
•
Efficient, Long Lasting

Send for catalog and engineering data



Flexible Couplings



Variable Speed Pulleys and Transmissions

Universal Joints

FLEXIBLE COUPLINGS:

No lubrication required. Provide positive protection against vibration, torque, shock of intermittent loads. Cushions changed without shutdown. Every duty from 1/6 to 2500 hp.

VARIABLE SPEED PULLEYS:

Quickly installed on new or old equipment. Change speed while machine is running. Ratios to 3 to 1. Fractional to 10 hp.

SELECT-O-SPEED TRANSMISSION:

Economical as compared to other variable speed transmissions. Instant adjustment over wide range of speeds. Hand wheel or lever control. Ratios to 10 to 1. Fractional to 5 hp.

UNIVERSAL JOINTS:

Precision ground. Finest alloy steel. No binding, backlash or end play. 13 sizes. Diameters ½ to 4 in. Bores ¼ to 2 in. Lengths 2 to 10⅝ in.

LOVEJOY FLEXIBLE COUPLING COMPANY

4866 W. Lake St. Chicago 44, Illinois

PICKLING TANK TEST
in 3 minutes
with
FERRO PICKLE PILLS

If you can tell red from green, and count to ten, the job is easy. That's why Ferro Pickle Pills have been standard equipment in the best pickling rooms, for years. They're efficient, economical, and easy to use.

There's a Ferro Pickle Pill for almost every pickle room need; a simple, sure way of determining the solution percentage of sulphuric acid, muriatic acid, alkali and metal-cleaning tanks . . . or the iron content of any of these solutions. One try will convince you. *Write today for literature and prices!*

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4150 E. 56TH STREET
CLEVELAND 5, OHIO

100th ANNIVERSARY
1854 — 1954

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QUALITY INDUSTRIAL FASTENERS SINCE 1854

BOLTS • NUTS
RIVETS and SCREWS...

Quality • Dependability
Prompt Delivery
For further information, write
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CLARK BROS BOLT CO.
MILLDALE, CONN.

For Greater Security...
Fasten Fast with Clark Fasteners

FIRST!
to Develop Continuous, Automatic Heating, Quenching and Drawing Equipment

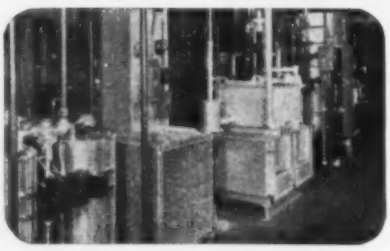
FIRST!
to Pioneer and Perfect the Use of Endothermic, Exothermic and Other Special Atmosphere Treatments

EF

FIRST!
To Develop Continuous Furnaces Using Low Cost Atmospheres for Bright Annealing Ferrous and Non-Ferrous Tubing, Strip, Wire, etc.

FOR MORE THAN 35 YEARS THE INITIALS "EF" HAVE SYMBOLIZED THE MOST ADVANCED HEAT TREATING ACCOMPLISHMENTS

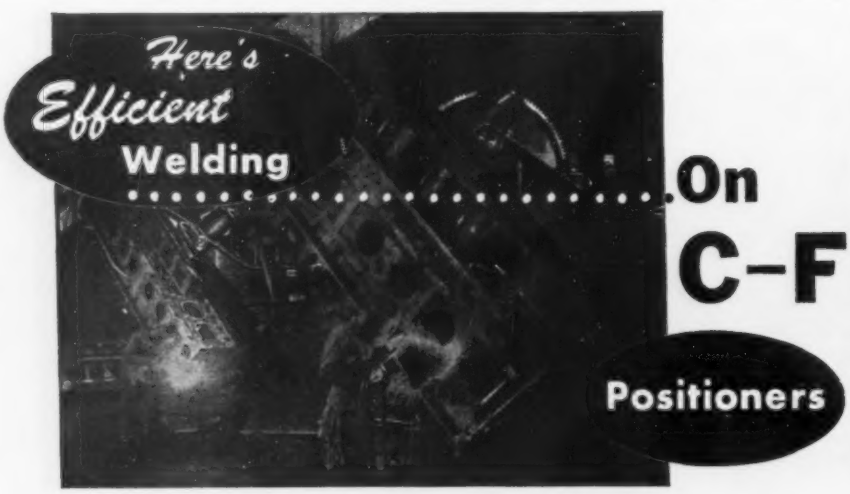
● To maintain and improve your competitive position, to get maximum efficiency, and economy, and utmost dependability and uniformity of finished product month after month, specify EF furnaces. Built in roller hearth, roller rail, chain belt, wire belt, car type, bell, rotary and many other designs,—furnished complete with special atmosphere generators, material handling facilities, and other accessory equipment to meet your specific requirement. Gas-fired, oil fired or electrically heated. Let EF engineers with their years of experience and many outstanding accomplishments work with YOU on YOUR next heat processing equipment problem.



EF exothermic generator, with refrigerator and dryer, producing atmospheres for bright annealing ferrous and non-ferrous products.

Gas-Fired, Oil-Fired EF *and Electric Furnaces*
for any Process, Product or Production
THE ELECTRIC FURNACE CO.
WILSON ST. at PENNA. R. R. *Salem - Ohio*

Canadian Associates • CANEFCO LIMITED • Toronto 1, Canada



When heavy, unwieldy weldments like these diesel crankcases can be quickly swung into any position so that every weld is made *downhand* —that's efficient welding!

Welders spend more time welding—do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

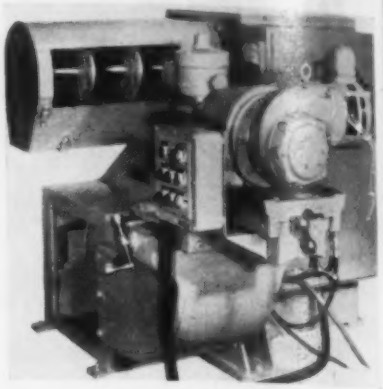
Write for Bulletin WP26—an illustrated circular detailing the *Specific* advantages of C-F Positioners.

CULLEN-FRIESTEDT CO.
1303 S. Kilbourne Ave., Chicago 23

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

C-F positioned welds mean better, more economical welds

—Tool Show Previews—



100 lb in weight. Its workholder is integral with the lathe, providing a fixed relation between the work and the brushes. Brushing time and pressure are preset. The operator simply puts the piece in the holder, presses a starting button, and the machine does the rest. *Osborn Mfg. Co., Booth 627.*

For more data circle No. 97 on postcard, p. 151.

Precision cleaning

Precision cleaning and finishing of small parts are advantages of the new Model 30 Liquamatte wet blasting machine. The machine, 2 ft 6 in. square and 6 ft 11 in. high, is intended for parts that can be lifted and handled manually, and

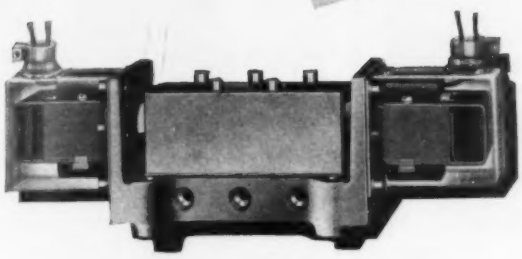
which are capable of going through the 22½ x 19 in. door. Cleaning is done by very fine mesh abrasive suspended in a water slurry, and thrown at the work through a nozzle, by means of compressed air. *American Wheelabrator & Equipment Corp., Booth 1209.*

For more data circle No. 98 on postcard, p. 151.

Turn Page

Quick-As-Wink
AIR AND HYDRAULIC
Control Valves

FEATURE THIS MONTH

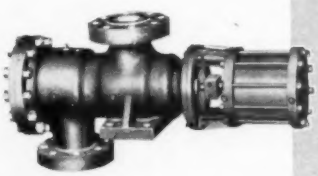


1/8" and 1/4" Double Solenoid Valves

Their reduced amperage requirement simplifies electrical circuits

● These valves are extremely simple in design — but ruggedly built — and will give millions of cycles of efficient, trouble-free, dependable operation. For air to 125 psi, vacuum, or low pressure hydraulic service. Up to 300 cycles a minute. Solenoid armature bears directly against the valve plunger eliminating levers, links, pins, etc. Low amperage requirement simplifies the electrical circuit. The valve is reversed by energizing first one solenoid, then the other. The valve and both solenoids are mounted on an aluminum base, and can be removed independently without disturbing the piping. 2-way, 3-way, double 2-way, 4-way and 5-way actions.

also the following

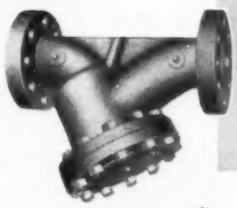


DESCALING VALVES

Specially designed for descaling hot strip and large steel forgings. Widely used. 2" to 6" sizes. Capacities to 1550 Gals./Min. Design eliminates destructive water hammer and reduces hydraulic shock to a minimum.

HIGH PRESSURE STRAINERS

Used ahead of descaling valves to prevent foreign material from plugging spray nozzles causing scale streaks in strip—also in hydraulic lines to protect valves, cylinders, and other machinery. 1½" to 6" sizes. Highly efficient. Easily cleaned.



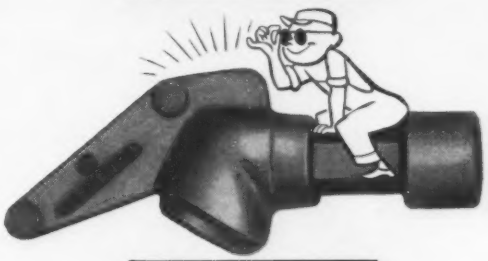
For Fully Descriptive Data Sheets Write

C. B. HUNT & SON, Inc.

Hand, Foot, Lever, Cam, Pilot, Diaphragm and Solenoid Control Valves

2044 EAST PERSHING STREET • SALEM, OHIO

CLEAN



BRIGHT

ACCURATE

STRONG

Clean, bright, accurate, strong — that's the story of Ritco Drop Forgings. We produce parts to your blueprint in steel or non-ferrous metals, in weights from ¼ lb. to 15 lbs.

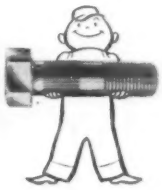
Come to Ritco for Drop Forgings, special fasteners, and finished bolts with regular or heavy heads. Also, take advantage of our complete facilities for finishing — machining and grinding. Send blueprints and specifications for free estimates.

Rhode Island Tool Company, 148 West River Street, Providence 1, Rhode Island.

1834 ★ 1954

SERVING AMERICAN INDUSTRY FOR 120 YEARS

RITCO



Exclusive New England Representatives for Cleveland Cap Screw Co.

√ more effective √ less costly

PRECISION FINISHING

Tools, dies, molds and precision machine parts can now be finished mechanically to tolerances as close as .0001" easier, quicker and at less cost by the Liquamatte wet blasting process. Scale, fine burrs and grinding lines are removed in seconds, without breakdown of sharp edges or corners.

The Liquamatte process can be used for an unlimited variety of finishing operations such as the removal of heat treat scale, surface cleaning, fine deburring, blending grinding lines, finishing and redressing dies, preparing surfaces for plating and other coatings, prolonging cutting tool life, special surface finishes, and general maintenance cleaning.

The Liquamatte is made in a range of sizes and designs to meet every precision finishing requirement. Write for descriptive literature.

Die & Mold Finishing

Provides surface easy to polish with finer papers. Blends directional polishing lines. Removes smeared or amorphous metal caused from paper polishing. Produces finish that will "wet" with lubricants and break in quickly.

Die & Mold Maintenance

Cleans and removes hydrocarbons, oxides and smeared metal. Reduces redressing time. Prepares dies and molds for greasing and storing. Prepares surfaces for rebuilding by welding, brazing and plating.

Tool Finishing

Finishes broaches, hobs, cutters, drills, etc. Removes fine wire burrs formed by grinding. Produces clean, scale-free surface that provides firm bond for plating.

New — MODEL 30

Write for Bulletin 43

Surface Preparation For Plating

Fine matte finish anchors the plate in a firm metal-to-metal bond. Liquamatte finishing after plating brightens surface and provides finish that wets more readily with lubricants to save break-in time.

Scale Removal

Heat treat scale and discoloration are removed while holding tolerances of .0001". Removes scale at the rate of approximately 75 to 100 square inches per minute.

Polishing

Produces clean uniform surface so that polishing wheels have no scale to remove. Matte type surface is nonglaring under lights and is less fatiguing for polisher to work on.

American WHEELABRATOR & EQUIPMENT CORP.

LIQUAMATTE WET BLASTING

510 S. Byrkit St. Mishawaka, Indiana

—Tool Show Previews—

High speed grinder

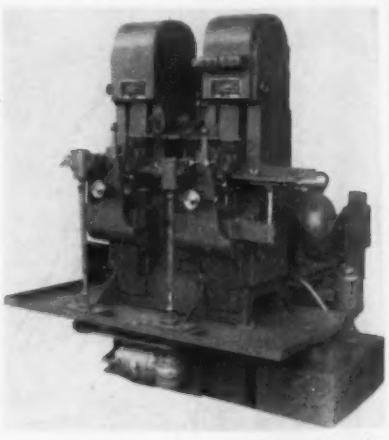
A hand grinder with speeds variable from 700 to 50,000 rpm has advantages in clean up grinding operations. A 1-hp, 3-phase motor with a V-belt pulley drive has the advantage of operating at full selected speeds under full load. The

wide range of speeds are controlled by a hand dial, which in turn actuates the flexible drive shaft. Absence of gears or other conventional mechanisms makes the unit simple and economical to use and maintain. *Metal Removal Co., Booth 1446.*

For more data circle No. 99 on postcard, p. 151.

Twin unit speeds polishing

A newly developed centerless polishing and finishing unit, a two-head machine using abrasive belts and coolants, is equipped with separate feed drive motor. A recirculating coolant system helps pro-



duce results not possible with the dry belt method. Many materials such as rubber, glass, and thermoplastics require coolants in grinding and finishing. *Production Machine Co., Booth 1731.*

For more data circle No. 100 on postcard, p. 151.

Turn Page

The Harrington & King Perforating Co.

5657 FILLMORE ST., CHICAGO 44, ILLINOIS
NEW YORK: 114 LIBERTY STREET, 6

PERFORATED MATERIALS
Industrial - Ornamental
Any Perforation — Any Coil, Sheet or Plate Material

MATERIALS

All of the metals — steel, copper, brass, aluminum, monel, zinc and stainless steel.
Wood Products — hard boards and plywood.
Plastics—and plastic coated fabrics in sheets or rolls. Materials can be perforated in sheets, plates or coils.

PERFORATIONS

Round holes from 1/50" diameter up through 9" diameter.
Slotted patterns from .006 wide, upward. Squares, triangles, ornamental and special shapes in a wide range of patterns, spacings and arrangements.

FABRICATING

Shearing, rolling, welding, embossing and other fabrication when required.

FACILITIES

The largest shop in the country devoted exclusively to perforating — with 70 years of experience and specialized equipment designed to handle small or large orders—with emphasis on quality workmanship at lowest possible prices.

Catalog No. 62
Fully illustrates and describes H & K Perforations —write for your copy.

If it can be perforated . . . H & K can perforate it!

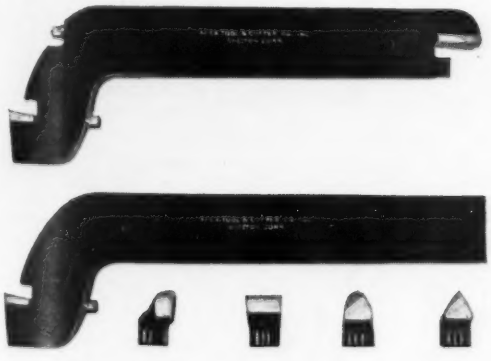
APEX INSERTED-BLADE METAL-CUTTING TOOLS

APEX MILLING CUTTERS

Made with inserted blades, all drop-forged of selected steels.

Adjustable for diameter or width.

Single or multiple operations with blades of High Speed, Super Cobalt, Stellite, Rexalloy, or Carbide Tipped. Standard sizes, including large diameters, carried in stock.



APEX TOOLS FOR LIGHT OR HEAVY PLANER WORK

Adjustable serrated for maximum wear. Over 50 standard shapes of tool bits interchange in one holder. Angle tools for Plate Planers carried in stock. Special shapes to order.

Tools drop-forged of High Speed Steel, Super Cobalt Steel, or tipped tools of Stellite, Rexalloy, or any grade or make of Carbide. Furnished ground ready for use.

Service representatives available. Send for catalog.

APEX TOOL & CUTTER CO., INC. • SHELTON 12, CONNECTICUT

"KRANE KAR SAVED US $3824.24 IN 8 MONTHS,"

Says V. James DeNaples,
TECHNICAL SERVICES FOREMAN,
NORMA-HOFFMANN
BEARINGS CORP.

"THIS VERSATILE YARD CRANE simplifies our materials-handling," says Mr. DeNaples, "cuts operations and travel trips, saves us a considerable amount of work and time. Our ***KRANE KAR*** speeds unloading of incoming materials . . . transports and stacks them at storage . . . loads them on floor trucks for delivery inside *(long shafts of tubing, stacked bearing ring forgings, 800 and 1000 lb. coils of steel strip).* Also loads outgoing scrap and waste drums on trucks and gondolas; tows sludge wagon from grinding waste chute to waste dump, up-ends it, tows it back." Monthly net savings—$478.03! *Ask for Bulletin No. 89.*

Gas or diesel, 9 to 37 ft. booms or adjustable telescopic booms; pneumatic or solid rubber tires; electric magnet, clamshell bucket and other accessories.

USERS: Carnegie-Illinois Steel, U.S. Steel, Bethlehem, Youngstown S. & T., Basic Magnesium, Lima Locomotive, General Motors, Pullman Standard, Etc.

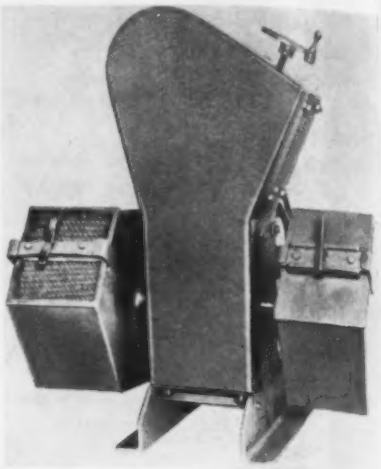
KRANE KAR **Swing Boom Mobile Crane . . . 1½, 2½, 5 and 10 Ton Cap.**

SILENT HOIST & CRANE CO. 851 63rd ST., BROOKLYN 20, N.Y.

—Tool Show Previews—

Versatile tumbling barrels

High production capacity for processing of small parts is attained with a bench twin tumbling barrel. Advantages of closed horizontal tumbling action with bench barrel size are attained. A wide



choice of drum sizes, weight capacities, type of drive and drum speeds permit combinations tailor-made to specific requirements. Extra heavy construction is used throughout. *Tumbling Sales & Service Co., Booth 2063.*

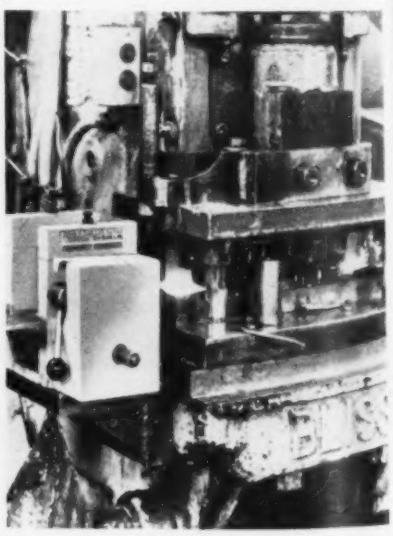
For more data circle No. 101 on postcard, p. 151.

Industrial Equipment:

More modern equipment holds key to lower costs.

Simplified press feeding

New roll feeds for feeding punch presses, used with a new straightening machine and coil stock grade, speed production on press-made parts. The combination may be



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Your Costs Will Slide Down Too!

Although the PEDRICK PRODUCTION BENDER shown is bending two "D" sections simultaneously for sliding board rails—the same machine is used for bending pipes, tubes, reinforcing bars and structural shapes, by merely changing the die on the central spindle. Most bends can be made in multiple. The automatic duplicate bending feature, included on all models, greatly increases accuracy and production.

VISIT OUR BOOTH #1442
At The
PHILADELPHIA A.S.T.E. SHOW
APRIL 26-30, 1954

Write For Descriptive Folder.

PEDRICK TOOL AND MACHINE COMPANY

3640 N. Lawrence Street
Dept. 2, Philadelphia 40, Pa.
U. S. A.

THE INSIDE STORY
TO EFFICIENT DUST COLLECTING WITH A CYCLONE SEPARATOR BY

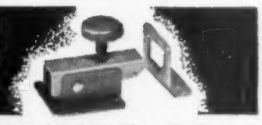
TORIT

Here's a cut-away view of a cyclone type Torit Dust Collector. Dust laden air spins downward with centrifugal action forcing nearly all the dust to drop into the bottom reservoir. What little escapes moves up the center to be exhausted, either outside or to an after-filter bag.

Cyclone type Torit Dust Collectors trap up to 95% of the dusts . . . even lints from rag buffing wheels. To this efficiency you can add other savings . . . a minimum of piping to reduce friction losses and running times that coincide with the work being done.

Torit Dust Collectors in cyclone or cabinet types can solve your dust problems, protect working conditions and employees' health. For complete information write:

TORIT DOOR FASTENERS...The sturdy and efficient door fastener used on Torit cabinets is available for use on your products. Strike plate either flat or angular. Write for quantity prices.



TORIT MANUFACTURING CO.
277 WALNUT STREET ST. PAUL 2, MINN.
See our Booth No. 2158 at the ASTE Exposition in Philadelphia

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WORLD'S GREATEST TRADE EXHIBITION

PARIS INTERNATIONAL TRADE FAIR
(FOIRE de PARIS)

MAY 22 TO JUNE 7

Here assembled in one location on the banks of the Seine you will find the newest industrial products, designs and equipment of France and all nations. Over the years the world famous Foire de Paris has grown in scope and importance . . . this year you will see the world's most graphic presentation of international production.

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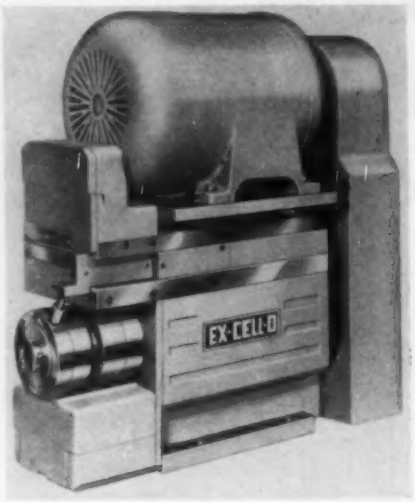
FRENCH CHAMBER OF COMMERCE OF U. S.
630 Fifth Avenue • New York 20, N. Y. • Phone: Circle 6-0120

used to feed short or long lengths, feeding punch presses or shear lines. With two limit switches, the actuator is eliminated and the unit may be placed close to the press or shear without a slack loop. *Rowe Machinery & Mfg. Co., Inc. Booth 1754.*

For more data circle No. 102 on postcard, p. 151.

Versatile power unit

A self-contained, compact, hydraulically operated power unit designed for actuating a single tool or a multiple spindle head in easily controlled automatic cycles has been developed. The 8-in. stroke

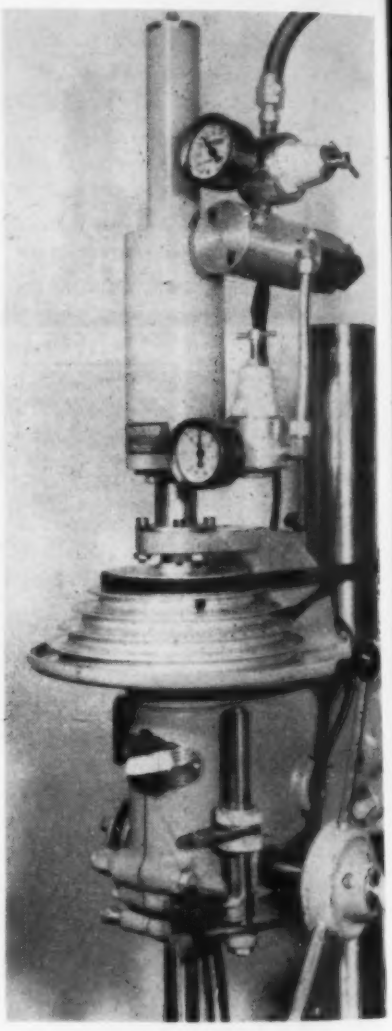


quill-type power unit is suitable for feeding, rotating and retracting cutting tools and is especially suited for use with special machinery. *Ex-Cell-O Corp., Booth 1526.*

For more data circle No. 103 on postcard, p. 151.

Speeds drilling

Faster drill press feeding is possible with a pneumatic power feed unit for drill presses. The Rotafeed attaches directly to the drill press spindle and operates on 40-60 psi on the power stroke and 10-15 psi on the return stroke. These low



pressures provide extra capacity for multiple spindle drilling or tapping. The unit is completely automatic, being triggered by a momentary contact switch. *The Pneumatic Co., Booth 2007.*

For more data circle No. 104 on postcard, p. 151.

SHELDON
CHICAGO U.S.A.

More will be *profit* with a SHELDON

It actually costs less to do turning jobs on a Sheldon Precision Lathe. Machine-tool investment is cut to a fraction. Power cost is materially reduced. Less experienced operators can operate Sheldons safely and efficiently. Even cost-loadings for plant—floor space, heat and light are lower because two Sheldons can often operate in the space occupied by one large lathe.

On most "everyday" jobs a Sheldon will actually turn out more pieces per hour too. With double V-belts to the spindle Sheldon lathes deliver enough power to take heavy cuts in direct drive, at high speeds. Sheldon's "Zero Precision" Taper Roller Bearings permit work to the closest tolerances. Seldom are such extremely accurate bearings used in moderate priced lathes.

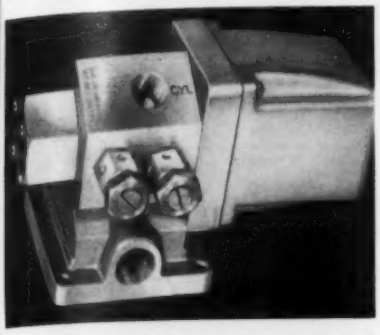
You will actually keep more as profit if you use Sheldon Lathes.

Write for Catalog

SHELDON MACHINE CO., Inc. 4224 North Knox Ave., Chicago 41, Illinois

Design new solenoid valve

Improved design features have been built in a new Hi-Cyclic solenoid valve. Included are heavy duty solenoids in dust and moisture proof enclosures, nylon and thrust



shock bushings for positive spool location and interchangeable parts allowing changes from one model to another in the field. Solenoid coils are provided with quick disconnectors. *Beckett-Harcum Co., Booth 1054.*

For more data circle No. 105 on postcard, p. 151.

Tool Grinding:

Improved grinding, wheel dressing equipment to be shown.

Wheel costs cut

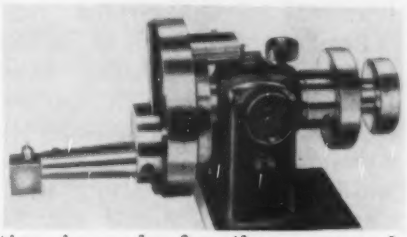
Longer life for diamond grinding wheels at lower cost is claimed for a new type wheel. An ingredient added to the bond gives the wheel adequate porosity to efficiently grind carbide. All cup and

periphery wheels in the new line are made with plastic centers to produce keener edges and reduce operator fatigue. The plastic center absorbs spindle and grinding vibration, resulting in smooth operation. *Precision Diamond Tool Co., Booth 1321.*

For more data circle No. 106 on postcard, p. 151.

Compensates for angles

A tilting feature to compensate for compound angles in grinding form tools has been incorporated in an improved compound wheel dresser. Where flat or dovetail form tools are ground, this dresser can be set up in the horizontal position to the radius and angles to be produced. By tilting the dresser and then dressing the wheel, compensation is made for the compound angles normally involved. *Last Word Sales Co., Booth 601.*



For more data circle No. 107 on postcard, p. 151.

Turn Page

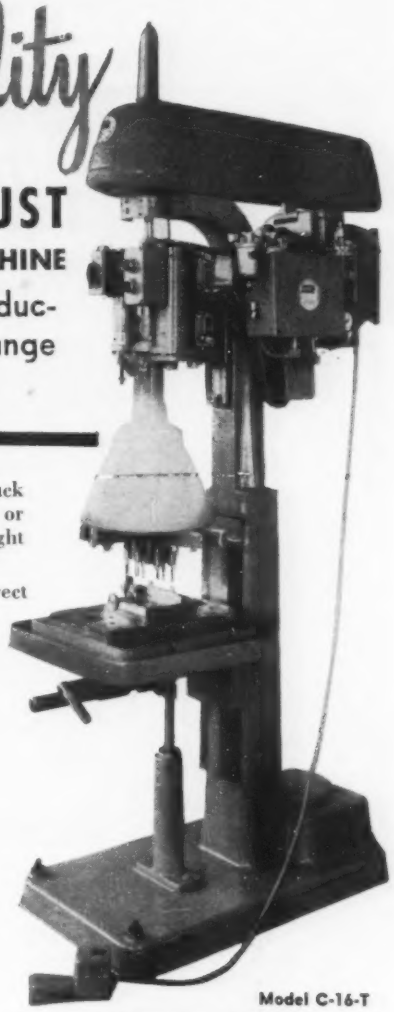
extreme flexibility

makes this new

BECKETT AIR THRUST

DRILLING & TAPPING MACHINE

ideal for small lot production on a wide range of work!



- Single and multiple tapping direct from chuck or any standard drill head without clutch or lead screw. Exact thread reproduction in light metals, plastics and high-strength alloys.
- Controlled air-powered thrust provides correct drilling and tapping action—completely variable and quickly adjustable approach speed, return speed and working thrust.
- Quick change-over from drilling to tapping or allied operations and from light to heavy work.

BECKETT Air Thrust Drilling and Tapping Machine, with electrically controlled "Hi-Cyclic" Air Feed, performs single and multiple tapping without employing a clutch or lead screw. Absolute and precise control of the air thrust at low pressures provides extremely sensitive tapping action. The tap provides its own lead and reproduces a thread with maximum fidelity to the ground tap. A Class 4 fit has been produced in magnesium.

This is a rugged, accurate machine, with heavy base, box column and gibbed ways for sliding head and adjustable work table. Available in models for drilling only and for drilling and tapping. Bench and floor types and table multiple units for continuous line production.

You can triple your drilling and tapping production—at great savings—with the new Beckett Air Thrust Drilling and Tapping Machine. The investment is low—and deliveries are good!

Model C-16-T

Electrically Controlled

HI-CYCLIC T.M. Reg.

Air Thrust

Max. thrust—980 lbs. at 100 p.s.i. Stroke—4" (6" stroke available) Capacity — Drill ¾" in steel; tap 1½" N.C. with 1½ h.p. motor.

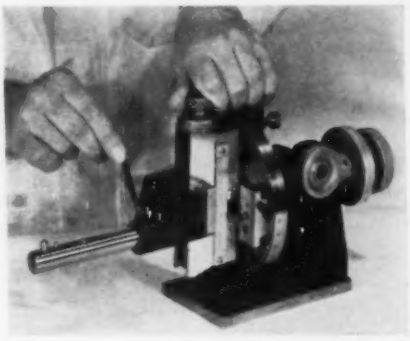
● ***Write TODAY for complete details and Your Copy of BULLETIN No. 50***

BECKETT-HARCUM COMPANY, INC.

1092 Wayne Road, Wilmington, Ohio

Improved wheel dresser

Precision dressing of angle-tangent-to-radii grinding wheel forms is possible with the redesigned Tangi-Matic dresser. A removable arm permits use of extension arms for dressing large diameter wheels. Angles may be dressed tangent to radii full 180°, it is claimed. Set-up time is short since gage blocks, height gages, micrometers are not needed. *Perfex Gage & Tool Co., Booth 428.*



For more data circle No. 108 on postcard, p. 151.

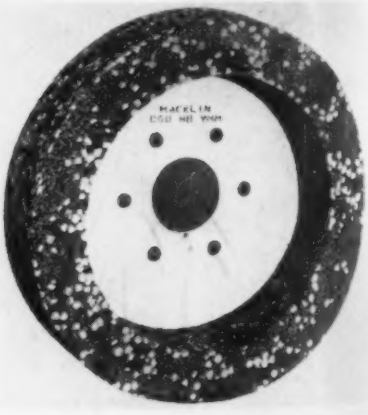
Two wheels in one

Two wheels in one permits finish grinding and diamond lapping of cutting tools and contributes to tool room efficiency. Finer finishes, insuring increased tool life are reported. The diamond lapping operation is completed in a few seconds' time after finish grinding with the outer edge of the wheel. Wheels are made to a high degree of mechanical accuracy. *Penn Scientific Products Co., Booth 115.*

For more data circle No. 109 on postcard, p. 151.

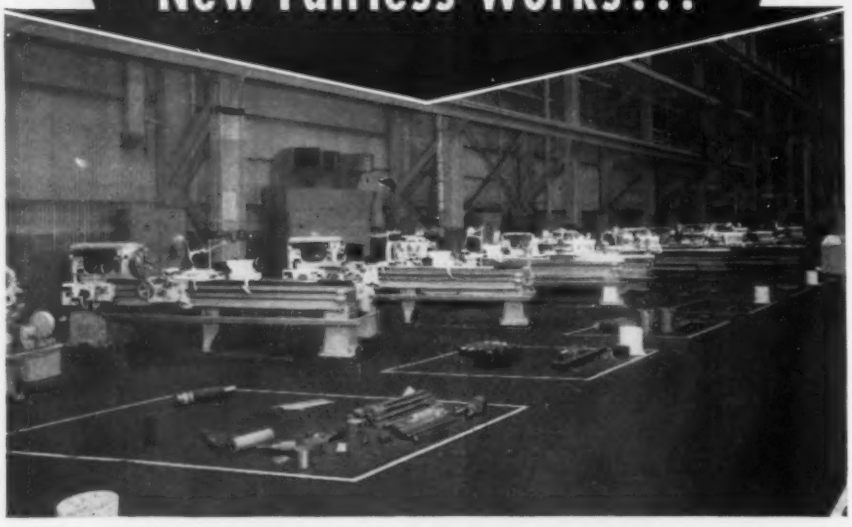
Cuts carbide grinding costs

Lower costs in grinding of carbide tools are claimed possible with a new Macklin MM Wheel. Increased wheel life and lower wheel and labor costs are reported. A fine loose abrasive is embedded in pellet form throughout the wheel. A flow of loose abrasive between metal and wheel permits the main body of the wheel to be somewhat harder than is normally used for the grinding of carbides. *Macklin Sales Co., Booth 1409.*



For more data circle No. 110 on postcard, p. 151.

13 LEHMANN Engine Lathes NOW at work in U. S. Steel's New Fairless Works...



The largest integrated steel mill to be built at one time uses LEHMANN Lathes in its modern maintenance shops!

The Fairless Works, built on 3,900 acres and one of the biggest expansion projects built in our time, incorporates the most modern steel mill equipment available. One of the big jobs at Fairless is that of maintenance. Special shops to keep all the equipment used in this 2.2 million ton plant in top running order are an important part of Fairless.

The machine tools, cranes and other equipment necessary for cleaning, machining and repairing the mill operating equipment (which, in fact, make practically all repairs required at Fairless) include 13 Lehmann engine lathes! Some of these lathes are shown in the above photo.

Find out how Lehmann Lathes can bring efficiency, safety and speed to the operations in your plant. Write today for information or catalog — or — send prints for time and money saving recommendation.

LEHMANN MACHINE COMPANY
GRAND at CHOUTEAU • ST. LOUIS 3, MO.

DIVISION OF NOVO ENGINE CO

Cuts maintenance costs

Functional as well as modern design is incorporated in a new pedestal grinder. Motor is mounted below. Wide space around each wheel allows free arm movements. Setting the wheel spindle forward

on the pedestal provides added work room. Interior motor mounting protects the motor from dust, a principal cause of motor wear and failure. Wheel weight is not on motor bearings. *South Bend Lathe Works, Booth 1709.*

For more data circle No. 111 on postcard, p. 151.

Diamond dressing tool

An improved diamond dressing tool has been developed for dressing the wheel on a Reishauer gear grinder machine. The tools are

used in pairs. Due to the extreme accuracy of the gears produced by this machine, tolerances of this new tool must be held to 0.00005 in., it is claimed. These tools enable the machine to fabricate gears from pitches DP 48 to DP 6. *United Diamond Tool Corp., Booth 2015.*

For more data circle No. 112 on postcard, p. 151.

Simplifies drill grinding

All drills from ⅛ to 2½ in. in diam, and with two, three or four flutes may be ground without use of chucks or collets, on a bench model drill grinder. The unit is easy to set up and operate. Features include a permanently mounted diamond wheel dresser, automatic compensation for wheel wear, accurate scale settings for various size drills. *McDonough Mfg. Co., Booth 2005.*

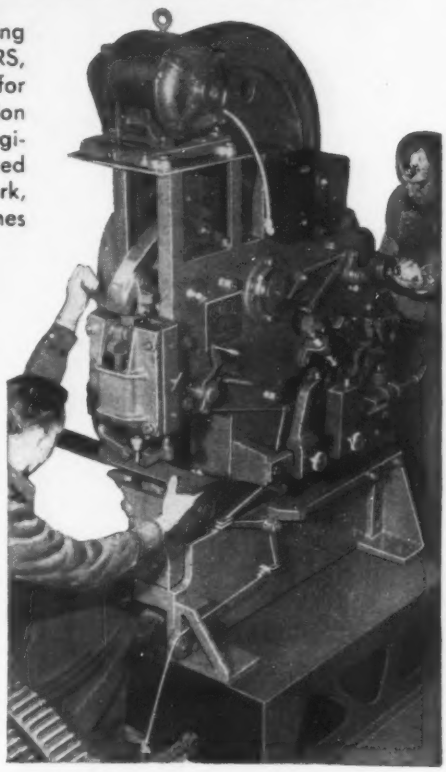
For more data circle No. 113 on postcard, p. 151.

Turn Page

WEBB PLATE FABRICATING MACHINERY

Steelworkers ALL STEEL CONSTRUCTION

The Webb Corporation, in presenting the line of new WEBB STEELWORKERS, has designed versatile machines for either job-work or high production work. These units have been engineered to meet the particular need of shops having a variety of work, with a result that all-purpose machines are now available.



Five Complete Tools are Incorporated in a Single Unit.

1. Punch for plate, bars or structurals.
2. Cuts angles and tees with straight or miter cut.
3. Cuts off round and square bars.
4. Shears plates and bars.
5. Coping or notching attachment.

One of the main features of these machines is that they are at all times in complete readiness to do any of the above operations and to do the work well.

The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. E.

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SLIP ROLLS

PYRAMID TYPE ROLL

INITIAL TYPE ROLL

STEELWORKERS

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Since 1881 THE **WEBB** CORP.

WEBB CITY, MO., U. S. A.

Continued

The Possibilities For Castings In Airframe Design
A. H. Petersen, Design Group Engineer
Lockheed Aircraft Corp.

Automation of Shell Molding
L. J. Bishop, Vice President & Director of Engr.
Mechanical Handling Systems, Inc.
8:00 pm Ballroom Bellevue-Stratford Hotel

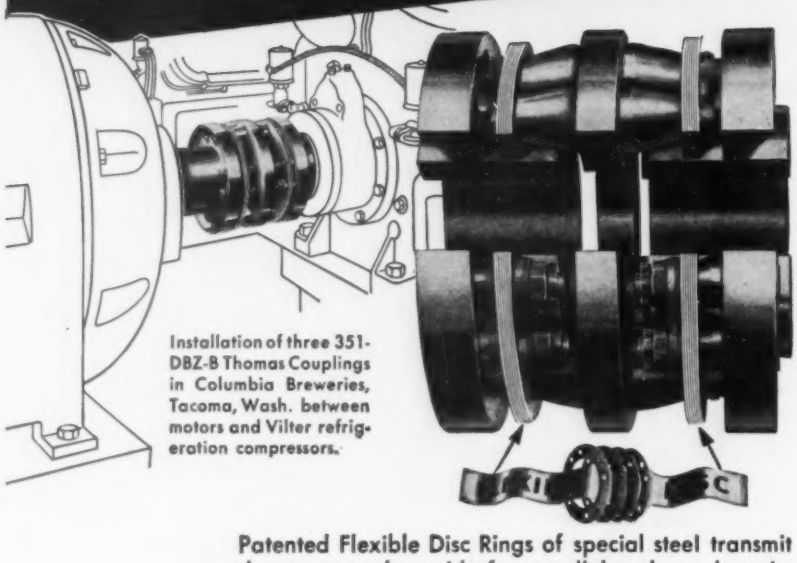
Nucleonics Invade the Tool Engineering Field
L. S. Goldring, Radiochemist
Nuclear Development Associates, Inc.
8:00 pm Burgundy Room Bellevue-Stratford Hotel

Tooling For Automatics (Panel Discussion)

Visualizing Plant Layout In Three Dimensions
H. H. Rasey, President
Visual Plant Layouts, Inc.
10:00 am Ballroom Convention Center

The Challenge of Automation
John Diebold, Management Consultant
1:30 pm Arena Conference Room Convention Center

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

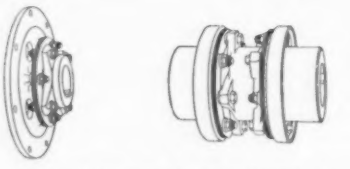


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

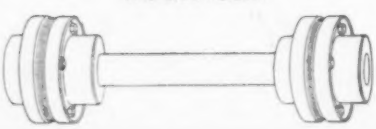
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



THOMAS COUPLINGS ARE MADE FOR A WIDE RANGE OF SPEEDS, HORSEPOWER AND SHAFT SIZES.



Write for our new Engineering Catalog No. 51A

THOMAS

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

Optical Tooling for Fixture Construction
R. E. Stegler, Engineer
Manufacturing Research Development Section,
Republic Aviation Corp.

New Concepts of Gaging and Inspection
W. I. Wilt, Asst. Manager, Sales
Harry Kiefaber, Gage Application Engineer
Sheffield Corp.
1:30 pm Ballroom Convention Center

Inspection Ways and Means (Panel Discussion)
3:00 pm Ballroom Convention Center

Friday, April 30

Product Design for Powdered Metal Parts
G. Stern, Vice President & Tech. Director
American Electro Metal Corp.

Tooling for Powdered Metal Parts
J. F. Kuzmick, Consultant
Welded Carbide Tool Co.
9:00 am Room 300 Convention Center

Plastic Fixtures Have Wide Use
B. Sokol, Plastics Engineer
Republic Aviation Corp.

Plastic Dies Move Into Regular Production Service
G. C. Adams, Staff Engineer
Rezolin, Inc.

Plastic Auto Body Developments
W. A. Hermonat, Technical Representative
Naugatuck Chemical Div., U. S. Rubber Co.
9:00 am Arena Conference Room Convention Center

Welding and Brazing of High-Temperature Materials
F. H. Stevenson, Production Engineer
Aerojet-General Corp.

Ferrous and Nonferrous Stud Welding
R. C. Singleton, Industrial Sales Manager
Nelson Stud Welding Div., Morton-Gregory Corp.
1:30 pm Room 300 Convention Center

Principles of Stretch Wrap Forming
K. Drone, Chief Engineer
Hufford Machine Works, Inc.

Planned Pre-Deforming of Shapes for Better Drawing
C. M. Geddis, Asst. Master Mechanic
Buick Motor Div., General Motors Corp.
1:30 pm Arena Conference Room Convention Center

Workholding Ways and Means (Panel Discussion)

Wednesday, April 28

Tracer-Controlled Pantographic Milling

A. D. Gunderson, Asst. Chief Engineer
George Gorton Machine Co.

New Arts in Jigless Boring

C. B. DeVlieg, President
DeVlieg Machine Co.

9:00 am Ballroom Convention Center

Chromate Conversion Coatings

C. W. Ostrander, Service Manager
Allied Research Products, Inc.

Metal Blasting and Finishing with Airless Blast Equipment

F. W. Pedrott, Director of Application Engineering
American Wheelabrator & Equipment Corp.

9:00 am Room 309 Convention Center

Postforming of Thermoset Plastics

St. John Bain, Project Engineer
The Formica Co.

Improved Design and Dimensional Control for Investment Castings

R. L. Wood, President
Arwood Precision Casting Corp.

9:00 am Arena Conference Room Convention Center

Manufacturing Applications for Coated Abrasive Belts

E. E. Oathout, Production Engineer
Behr-Manning Corp.

Hydraulically Cammed Profile Grinding

A. F. Alt, Chief Engineer
Planet Products Corp.

1:30 pm Arena Conference Room Convention Center

Flame Cutting with Electronic and Magnetic Tracers

R. F. Helmkamp, Machine Cutting Specialist
Air Reduction Sales Co.

Sub-Zero Chilling as an Industrial Process

R. S. Jamison, Asst. to the President
Sub-Zero Products Co.

1:30 pm Room 300 Convention Center

Ultransonic Tools for Hard-to-Machine Materials

J. P. Aloisio, Applications Engineer
Research Div., Raytheon Mfg. Co.

Hobbing at High Speeds and Heavy Metal Removal

J. W. Rapp, Supt. of Gear Manufacturing
Ohio Axle & Gear Div., Rockwell Spring & Axle Co.

3:00 pm Ballroom Convention Center

Shear-Fracture Parting of Steel Billets

W. C. Tucker, Chief Engineer
Machine Tool Div., Buffalo Forge Co.

8:00 pm Ballroom Bellevue-Stratford Hotel

Thursday, April 29

An Orderly Use Classification of Cutting Fluids

Successful Design of Steel Parts for Cold Extrusion

D. I. Brown, Market Development Manager
Koldflo Div., Mullins Mfg. Corp.

8:00 pm Burgundy Room Bellevue-Stratford Hotel

Clinic on Improved Milling Practice (Panel Discussion)

R. G. Mayer, Group Engineer
Pure Oil Co.

What's Known Today About Machining Titanium

G. T. Fraser, Sales Manager
Rem-Cru Titanium, Inc.

9:00 am Arena Conference Room Convention Center

Preparation and Tooling for Cold Pressure Welding

W. A. Barnes, Vice President Engineering & Production Div., Utica Drop Forge & Tool Corp.

9:00 am Ballroom Convention Center

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at minimum labor cost
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Contains amazing Kelite NU-RE-SOL®... Safe on Painted Surfaces...Built-in Scale Inhibitor... No odor, safe on skin and clothing... Exceptional "wetting-out" qualities.
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THE IRON AGE SUMMARY...

- Scrap prices rise for fifth consecutive week
- March was steel's low point; it's now stable
- Cancellations, deferments are less frequent

Steelmaking scrap prices rose this week for the fifth consecutive week. Increases raised THE IRON AGE Steel Scrap Composite Price 50¢ a ton to $25.67 per gross ton.

Ordinarily this would indicate that a substantial increase in steelmaking is just around the corner. But analysis of many interviews and field reports does not lead to such a conclusion at this time.

There is some well-founded hope that the ingot rate might edge up within the next month or two. The steel market is stabilized. And it now appears that it reached its low point last month. Yet it still lacks the zip needed to start a significant upward movement.

Producers point to increasing number of orders for "quick delivery" and nearing wage talks as potential stimulants. But steel buying psychology is still in need of a powerful stimulant before it can get off its back.

Barring a sudden darkening of the labor picture or increase in international tensions, the steelmaking recovery will probably be gradual and modest.

Scrap price increases so far seem more to reflect a correction within that industry itself than they do an upturn in steelmaking. Remember that the scrap industry has been suffering one of the longest and most painful corrections in its history.

After passing from scarcity to oversupply prices went into a long tailspin. It became increasingly uneconomic to collect material—especially in areas more remote from the mills. Result: Higher prices were needed to bring out the scrap.

An analysis of the markets bears out this conclusion. With the possible exception of Chicago, markets are still generally weak in spite of some price increases. And most scrap consumers still have large stocks.

While rate of new orders booked during April is not enough to boost production, it is at least equal to the rate of new business a month ago. Bulk of business placed now is for May delivery, although some June business is in and quick delivery requests may later boost May schedules after books would normally have been closed.

There's no question that steel order books have been through the wringer. Although this hasn't been very pleasant, it has at least made producers confident that their books are more representative of actual business. This is far different from a year ago when consumers were placing duplicate orders with more than one producer.

Cancellations, deferments, and other serious symptoms of downturn are no longer being received on the scale of the past few months. In fact there have been some cancellations of deferments and holdup orders. There has even been some setting ahead of orders. Time between sale and delivery is still being squeezed.

Steelmaking operations this week are scheduled at 68.5 pct of rated capacity, up half a point from last week's revised rate. Steel production index this week is estimated at 101.7 (1947-49 = 100).

Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Net Tons Produced (000 omitted)	1,634	1,622	1,624	2,276
Ingot Production Index (1947—49=100)	101.7	101.0	101.1	141.7
District Operating Rates				
Chicago	80.0	76.0*	75.5	106.0
Pittsburgh	71.0	73.0*	78.0	99.0
Philadelphia	60.0	60.0	61.5	94.0
Valley	61.0	61.0*	52.0	89.0
West	80.0	76.5*	66.5	103.0
Detroit	73.0	72.0	83.0	103.0
Buffalo	67.5	67.5	69.5	94.0
Cleveland	68.5	64.0*	57.0	101.0
Birmingham	53.5	46.0	78.0	101.0
S. Ohio River	77.0	75.0	70.0	88.0
Wheeling	90.0	81.0*	81.0	101.0
St. Louis	62.5	62.5	52.0	71.0
East	74.0	54.0*	74.5	93.0
Aggregate	68.5	68.0*	68.0	98.5

Per cent of capacity for weeks in 1954 is based on annual capacity of 124,330,410 net tons as of Jan. 1, 1954. Per cent of capacity for last year is based on annual capacity of 117,547,470 tons as of Jan. 1, 1953.
* Revised.
† Tentative.

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River Rouge • Rochester, N.Y. • Toledo • Union, N. J. • Washington, D. C. • Worcester, Mass.

FLAT ROLLED AND BAR AND TUBE STOCKS AND PROCESSING SERVICES FROM 11 PLANTS

Markets at a Glance

Shut Down Southern Mill . . . Openhearths and bessemers at Ensley, Ala. works of U. S. Steel's Tennessee Coal & Iron Div. have been shut down for repairs. Job is expected to take about a month during which time the mill's 1500 employees will take their paid vacations.

Earnings Off . . . Preliminary figures released to shareholders of Detroit Steel Corp. show a loss of about 2¢ per share for first quarter 1954. In the same period of 1953, earnings were 70¢ a share. Sales for the 3-month period were $12,330,000 for the current year against $28,803,000 for the first quarter last year.

Construction Gets More Steel . . . Direct shipments of steel to the construction industry for Jan. and Feb. 1954 totaled 1,539,000 tons, a 9000-ton increase over the same period of 1953, reported American Iron and Steel Institute. Shipments of steel to the container industry in February, totaling 472,000 tons, represented an increase of 5000 tons over the same period last year.

Boost Tube Output . . . Timken Roller Bearing Co. will increase production of heavy-walled seamless tubing by erecting a $278,000 continuous annealing furnace at its Gambrinus, Ohio, plant. Increased demand from the oil industry for tool joint tubing and a substantial market in automatic transmissions were decided expansion factors. Forged steel has been used previously in tool joints but researchers feel heavy-walled seamless can be used more efficiently and economically in many applications.

Power Project . . . A new $50 million private power company to build two power dams was formed in Oregon last week. The new dams will yield 536,000 kw for the power hungry area and provide flood control benefits. Firms taking part are: Montana Power Co., Pacific Power & Light Co., Portland General Electric Co., Mountain States Power Co., Washington Water Power Co.

Labor Turnover Lower . . . Bureau of Labor Statistics reports less labor turnover in steel plants than in most other U. S. industries. In 1953 monthly separations from steel industry payrolls fluctuated between 1.9 and 3.7 pct of employment. In all manufacturing monthly separations ranged between 3.6 and 5.2 pct.

Carboloy Cuts Prices . . . Price cuts averaging 10 pct on cemented carbide blanks and 5 pct on standard tools and dies were announced by the Carboloy Dept. of General Electric Co. Finished, solid, cemented carbide, mechanically held inserts will be reduced up to 30 pct. Not affected by the price changes are Carboloy's new grade 370 cemented carbide, diamond dressers, and masonry drills.

Road Funds Boosted . . . Congress has agreed to increase the Federal Government's contribution to highway construction from the present $675 million a year to $966 million a year for the next 2 years. Breakdown of federal expenditure shows grants of $875 million to be matched by states, $81 million for roads on federal lands, and $10 million for inter-American highway and RAMA road.

Southern Prospects Favorable . . . Steel warehousemen in the South feel optimistic about 1954 business prospects. In their opinion, reduced inventories, easing of price-cutting from foreign sellers, high levels of construction, increased air conditioning and heating business, and possible price increases resulting from union wage negotiations are factors tending to stabilize prices and improve warehouse business.

Ease Export Curbs . . . Dept. of Commerce has ruled that a number of additional steel and tinplate products may be shipped to most countries without need for individual export licenses.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite prices				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$55.26
Scrap, No. 1 hvy (gross ton)	$25.67	$25.17	$24.17	$41.00
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	30.00	30.00	29.875	30.00
Lead, St. Louis	13.80	13.80	12.80	11.80
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	97.00	99.50	95.00	94.50
Zinc, E. St. Louis	10.25	10.25	9.75	11.00

Better Feeling Ushers In Zinc Meeting

Zinc Institute joins Die Casting Institute in promotion program . . . Imports dip in January, February . . . Aluminum market now "out of the woods"—By *R. L. Hatschek.*

While not overwhelming, definitely healthier conditions in the zinc industry appearing in the past month ushered in the American Zinc Institute's 36th Annual Meeting this week. The 2-day affair was held in St. Louis and was notable for two sentiments—cautious optimism that the worst is over and a determination to pull zinc out of its mire.

The current zinc situations in the U. S., in Canada and world-wide were discussed by various speakers. They agreed that the outlook is improving and that supply and demand are edging toward one another. When they meet—if they haven't already—it is hoped that prices will be nudged upward to a more economic level for producers.

Joint Action . . . Voicing a plan of action to improve conditions in two industries, David Laine, secretary of the American Die Casting Institute, announced a seven-point program to be undertaken jointly by the two institutes. He pointed out that the goal was a common one since diecasting accounts for 30 pct of slab zinc consumed and zinc diecastings represent 50 pct of the dollar volume of the diecasting industry.

The plan includes (1) a movie on diecasting, (2) a booklet amplifying the movie's material, (3) a national diecasting publicity program, (4) a diecasting exhibit to go with the film, (5) sponsorship of special showings for trade, technical and educational groups, (6) formation of speakers' bureaus to handle technical questions at showings, and (7) advertising and publicity announcing availability of the film.

Market Tones Down . . . The flurry of activity shown by zinc here and in London seems to have simmered down a bit with some sellers continuing to report fair trading and others indicating sales could be better. Most transactions are being done at a flat price basis with a few deals made on a monthly average basis.

Zinc imports reported for the first 2 months of the year total 19,874 tons of metal, 70,088 tons contained in ores and concentrates. This represents a decline of about 21.5 pct from the like period of 1953—and the decline from January to February was substantial.

Aluminum Perks Up . . . Optimism of aluminum producers is gaining momentum as salesmen note a definite firming in some lines during the past 2 or 3 weeks. One executive even said the industry was "out of the woods now."

Delivery generally is running from 3 to 6 weeks on mill orders for most products, about in line with normal order processing. To be sure, nobody's buying the light metal any farther in advance.

Statements Brighten . . . Reynolds Metals Co. reports that first quarter sales showed a drop of 8 pct from first quarter 1953 while earnings dipped only 6 pct. It's pointed out that this certainly isn't a disastrous dive. But at the same time, one should remember that aluminum facilities underwent a huge expansion during the year.

I. W. Wilson, Aluminum Co. of America president, last week underscored the firming trend by saying that aluminum business is trending upward on a gradual slope.

Not Worried . . . Commenting briefly on other matters, Mr. Wilson said that his firm's Taiya Valley (Alaska) project has not changed its status. That is, the Canadians are still investigating the possibilities of an all-Canadian project in the area. But Mr. Wilson feels that terrain and certain other factors will work against this.

On the Justice Dept. suit against Alcoa, Mr. Wilson said only that Alcoa's management had no fear concerning the case.

Scrap Higher . . . Rising spiral of copper scrap prices plus higher tin prices served to push up secondary brass and bronze ingot prices a week ago. Copper and brass scrap is still rising as a result of overseas demand and tin, of course, reacted to news from Indo-China. This week, dealer buying prices are higher for brass, aluminum, lead and most of the miscellaneous scrap grades.

NONFERROUS METAL PRICES

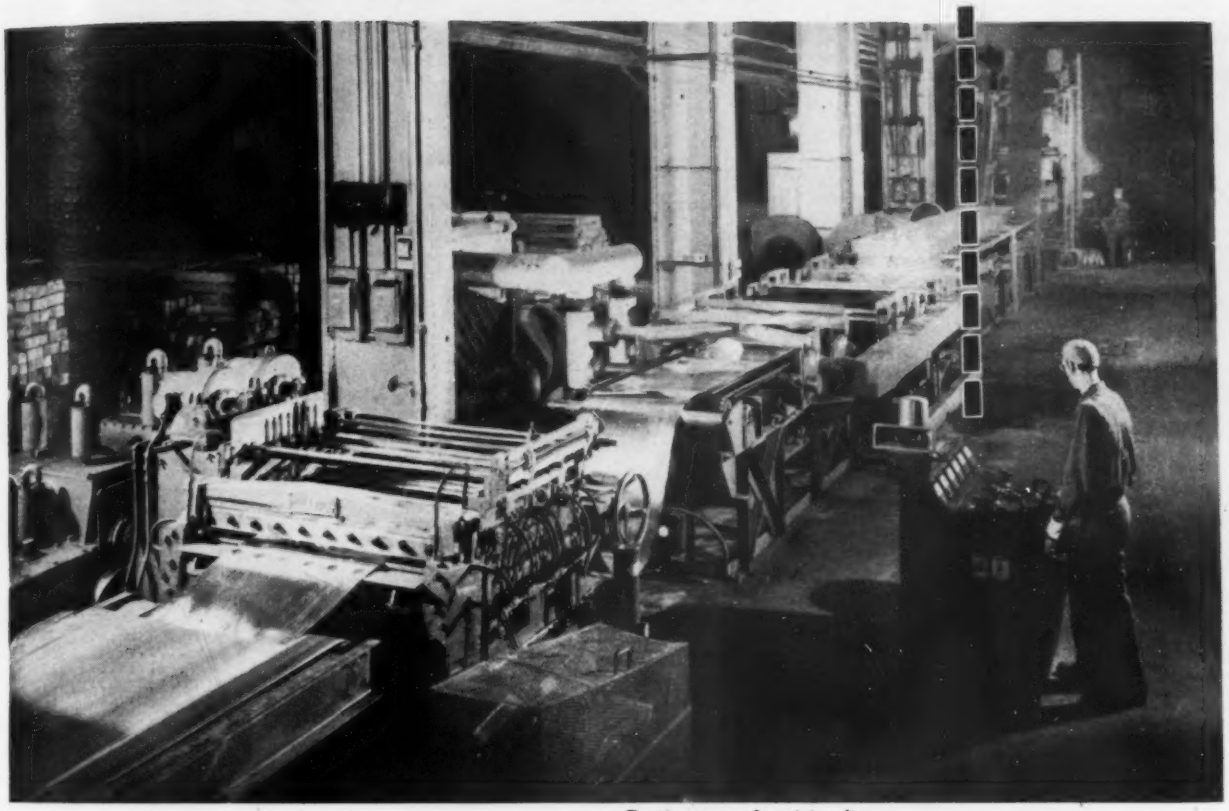
(Cents per lb except as noted)

	Apr. 14	Apr. 15	Apr. 16	Apr. 17	Apr. 19	Apr. 20
Copper, electro, Conn.	30.00	30.00	....	30.00	30.00	30.00
Copper, Lake, delivered	30.00	30.00	....	30.00	30.00	30.00
Tin, Straits, New York	97.25	97.50	....	....	97.00	97.00*
Zinc, East St. Louis	10.25	10.25	....	10.25	10.25	10.25
Lead, St. Louis	13.80	13.80	....	13.80	13.80	13.80

Note: Quotations are going prices
*Tentative

A signal achievement in sheet steel metallurgy

the continuous galvanizing process



Continuous galvanizing line
Courtesy: *Wean Engineering Company*

THE greatest advent in the sheet galvanizing industry since its inception is the continuous strip galvanizing line. Although zinc has been used as a protective coating for iron and steel products for more than a century, this change in method of application has established new standards of corrosion resistance, workability and surface quality for galvanized sheet steel.

Today's continuous galvanizing process imparts greater ductility to the steel base and results in a lighter, more uniform coating which takes the toughest forming without cracking, flaking, or peeling of the zinc coating.

Zinc is used as a protective coating more than any other metal. In fact, galvanizing accounts for the metal's largest use. It is easy to apply, low in cost, is readily available and lends itself especially well to continuous processing. Furthermore, zinc gives double protection. In addition to providing a mechanical barrier of corrosion-resistant metal, zinc protects steel by galvanic action. As a result, rusting of the steel at cut ends—or at bare spots caused by mechanical injury to the coating—is avoided as long as enough zinc remains nearby to be preferentially attacked.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE, NEW YORK 17, N.Y.

ST. JOE *electrothermic* **ZINC** HIGH GRADE · INTERMEDIATE PRIME WESTERN

Nonferrous Prices

(Effective Apr. 20, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 8, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to $1.29; 36 to 38, 47.2¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.449-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅝ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42⅝ x 60 in., $2.833; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in., 30.3¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.5¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape; Up to ½ lb, 10,000 lb; ⅛ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅜ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall; OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks	....	60	....

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41	....	48.43
Copper, h-r	48.38	44.73	....
Copper, drawn	....	45.98	....
Low brass	44.47	44.41	....
Yellow brass	41.72	41.66	....
Red brass	45.44	45.38	....
Naval brass	45.76	40.07	41.33
Leaded brass	....	....	39.11
Com. bronze	46.95	46.89	....
Mang. bronze	49.43	43.62	45.18
Phos. bronze	66.58	67.08	....
Muntz metal	43.96	39.77	41.02
Ni silver, 19 pct	55.36	....	62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb cont'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.80
Lead, New York	14.00
Magnesium 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
Ingot	27.75
Magnesium, sticks, 100 to 500 lb.	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$220 to $222
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$21.00
Platinum, dollars per troy oz.	$84 to $87
Silver, New York, cents per oz.	85.25
Tin, New York	97.00
Titanium, sponge, grade A-1	$4.72
Zinc, East St. Louis	10.25
Zinc, New York	10.75
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot	
No. 115	26.00
No. 120	25.25
No. 123	24.75
80-10-10 ingot	
No. 305	31.00
No. 315	28.75
88-10-2 ingot	
No. 210	40.75
No. 215	37.25
No. 245	32.25
Yellow ingot	
No. 405	22.25
Manganese bronze	
No. 421	26.75

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.25-24.00
0.60 copper, max.	23.00-23.75
Piston alloys (No. 122 type)	21.00-23.00
No. 12 alum. (No. 2 grade)	20.50-21.00
108 alloy	20.50-21.50
195 alloy	22.00-22.75
13 alloy (0.60 copper max.)	23.00-23.75
ASX-679	20.50-21.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	21.50-22.50
Grade 2—92-95%	20.50-21.50
Grade 3—90-92%	19.00-19.50
Grade 4—85-90%	18.00-18.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.54
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$1.75
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅞	23¼
Mang. bronze	18¼	17¼
Yellow brass rod ends	19⅛	....

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¼—26½
No. 2 copper wire	24¾—25
Light copper	23¼—23½
*Refinery brass	21⅛—22

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¼—26½
No. 2 copper wire	24¾—25
Light copper	23¼—24
No. 1 composition	20
No. 1 comp. turnings	19½
Rolled brass	16
Brass pipe	17
Radiators	16
Aluminum	
Mixed old cast	12½—13
Mixed new clips	14 —14½
Mixed turnings, dry	13 —13⅞
Pots and pans	12½—13

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	24
No. 2 heavy copper and wire	22½—23¼
Light copper	20½—20¾
New type shell cuttings	20½
Auto radiators (unsweated)	14 —14½
No. 1 composition	18
No. 1 composition turnings	17½
Unlined red car boxes	15½—16
Cocks and faucets	15½—16
Mixed heavy yellow brass	12½
Old rolled brass	14½—15
Brass pipe	16⅛—16½
New soft brass clippings	17½
Brass rod ends	15½
No. 1 brass rod turnings	14½
Aluminum	
Alum. pistons and struts	7 — 8
Aluminum crankcases	10½—11
2S aluminum clippings	13 —13½
Old sheet and utensils	10½—11
Borings and turnings	6 — 7
Misc. cast aluminum	10½—11
Dural clips (24S)	11 —11½
Zinc	
New zinc clippings	5½— 6
Old zinc	4¼— 4½
Zinc routings	2½— 2¾
Old die cast scrap	3½— 3¾
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	40
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel clippings	32 —34
Clean Monel turnings	14 —15
Old sheet Monel	20 —22
Nickel silver clippings, mixed	13
Nickel silver turnings, mixed	11
Lead	
Soft scrap lead	11 —11¼
Battery plates (dry)	5¾— 6
Batteries, acid free	4¼
Magnesium	
Segregated solids	20 —21
Castings	19 —20
Miscellaneous	
Block tin	75 —80
No. 1 pewter	55 —60
No. 1 auto babbitt	45 —48
Mixed common babbitt	12½—13
Solder joints	16½
Siphon tops	45
Small foundry type	15¼—15½
Monotype	13¾—14
Lino. and stereotype	13 —13⅛
Electrotype	11¼—11½
Hand picked type shells	8 — 8½
Lino. and stereo. dross	5½— 5½
Electro dross	3½— 4

• NON-FERROUS METALS
• ORES AND MINERALS
• METALLIC RESIDUES
• METAL SCRAP
• FERRO ALLOYS
• ZINC

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Markets Continue Spring Growth

Steelmaking scrap prices rise in Chicago, Cleveland . . . Other areas optimistic but slower to respond . . . Boston prices show increases . . . Chicago turnings up . . . Composite at $25.67.

Steelmaking scrap prices continued to rise in two major consuming districts this week. Chicago price for No. 1 heavy melting advanced $1.50 to $28.00 to $30.00. The Cleveland price rose $2 to $25.00 to $26.00. Other steelmaking grades in those districts showed comparable increases. A special feature of the Chicago market was strengthening turnings prices.

Other areas reflected the increases at least psychologically if not cashwise. There was a general feeling of optimism in almost all scrap circles.

Reports of dealer and collector resistance to present prices continued. But there is some reason to doubt that recent price increases have been a real sign of stronger mill demand. There is a good possibility that the advances have been, so far at least, more in the nature of an internal adjustment. But that remains to be seen.

Overall, THE IRON AGE scrap composite rose another 50¢ to $25.67.

Pittsburgh — Despite limited consumer buying the market held fairly steady this week. One mill was picking up openhearth material at prevailing prices but was paying slightly more for choice scrap. A broker reportedly was having difficulty covering orders at the lower figure. Blast furnace prices are said to be firming up, and the cast market is stronger. Low phos is up $1.

Chicago—Scrap continued to edge up in price. Operating rates were climbing but this could in no way account for the marked rise in scrap prices. General tone continues optimistic, despite small volume on most mill orders. General feeling: the market will continue a minimum advance of $1, probably as much as $2 or even $3. Railroad grades were steadying, and despite cast being "hot as a pistol" farther west, Chicago cast grades were temporarily holding last week's levels. Turnings, a surprise since the market climb began, were again edging up on the dealer market despite a slowing in mill buying.

Philadelphia—Trading in this area continues to drag despite continued strengthening in other major steelmaking centers. Only price action this week was a 50¢ decline in heavy breakable cast. View of some members of the trade is that as long as the Philadelphia ingot rate stays below the national average, there can't be any real strengthening.

New York—Brokers and dealers here are watching boosted scrap activity in other districts expectantly, but no one will commit himself as to just when this area will show strength.

Detroit—Prices picked up a half a dollar here and a half a dollar there, but in general the strength of other markets has not reached Detroit. Only token orders have been placed by local mills and inventories continue high. Some fair prices paid in other districts appear to have gone for scrap that brokers had in their own yards and were not translated into increases in brokers' buying prices.

Cleveland — No. 1 heavy melting went up $2 to $26 in Cleveland as strength from the Valley continued to be felt. Definite possibility of local buying in the near future is also bulling the market. Most items are tight as dealers wait for mills to work a little more fat off stockpiles.

Birmingham—Brokers report they are having difficulty filling orders for steel scrap in the district. Dealers, believing southern mills eventually will have to increase prices as has been done in some other areas, are holding on to the small amounts coming into the yards. With the farming season getting into full swing, the dealers say very little scrap is coming into the yards because other suppliers are unwilling to accept prices dealers can pay. On the other hand, steel mills and foundries seem well supplied and are not pushing for deliveries.

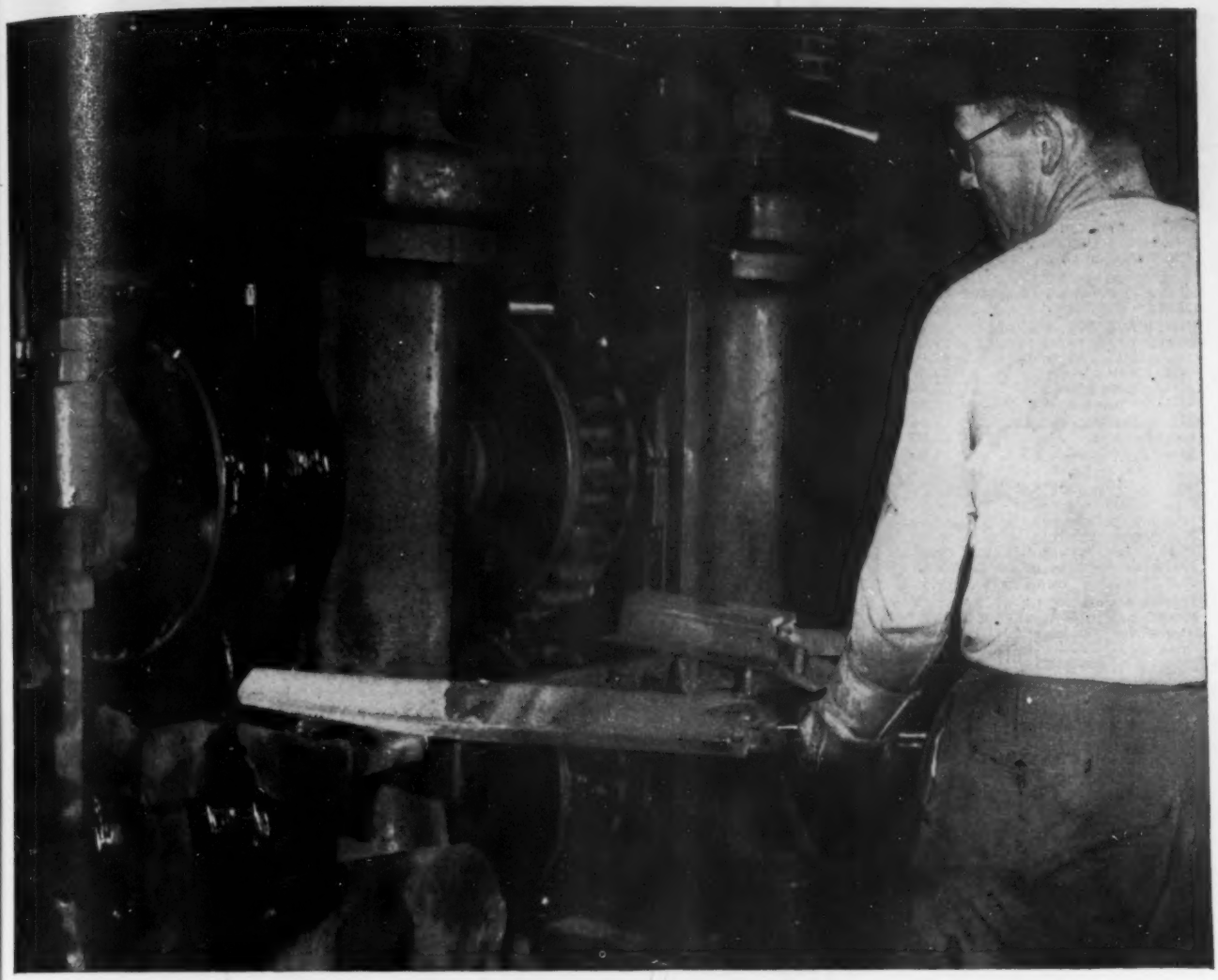
St. Louis—Renewed activities are reported in both rerolling and short rail, which were in short supply because of delayed railroad maintenance programs. Short rails are up $2 per ton. Cast business is better, and cupola cast and stove plate are up $1 and $3 respectively on better demand and short supply.

Cincinnati—Brokers' buying prices for rails, low phos, and heavy breakable cast all went up $1 as this area continued to reflect bullish sentiment. Local consumers reportedly are starting to meet dealer resistance on April prices. No new buyers are expected this month if barge shipments to adjoining areas don't materialize.

Buffalo—Cast continues to lead a stronger scrap market here. Cupola jumped an additional $2 per ton as demand exceeded supply. Steelmaking grades are unchanged with only a small sale of No. 1 heavy melting reported.

Boston—Several grades of steelmaking scrap show concrete firming of prices this week though, actual trading is little better than it has been. The price rise, first one in this area, stems mainly from better sentiment filtering through from other districts.

West Coast — Export tonnage of steel scrap from Los Angeles now amounts to almost half of tonnage being sold to area mills, it appeared last week. Export material, however, is predominantly No. 2 grades, currently a glut on the market. Only one major steel producer is in the market this month buying top grades. Shipments are on old orders with most West Coast dealers awaiting action by Japanese government which would permit financial arrangements for additional tonnage. Cast continues firm throughout California but price is unchanged.



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AL
FINE TOOL STEELS
SINCE 1854

W&D 4669

Scrap Prices

(Effective Apr. 20, 1954)

Pittsburgh

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	26.00 to 27.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	14.00 to 15.00
Mixed. bor. and ms. turns.	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Low phos. punch'gs, plate	30.00 to 31.00
Cut str'ct'r'ls, 3 ft & under	31.00 to 32.00
Heavy turnings	24.00 to 25.00
No. 1 RR. hvy. melting	30.00 to 31.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	33.00 to 34.00
RR. spring steel	33.00 to 34.00
RR. couplers and knuckles	33.00 to 34.00
No. 1 machinery cast.	42.00 to 43.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	30.00 to 31.00

Chicago

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	26.00 to 28.00
No. 1 factory bundles	30.00 to 31.00
No. 1 dealers' bundles	28.00 to 29.00
No. 2 dealers' bundles	19.00 to 21.00
Machine shop turn.	13.50 to 14.00
Mixed bor. and turn.	13.50 to 14.00
Shoveling turnings	15.50 to 16.00
Cast iron borings	15.50 to 16.00
Low phos. forge crops	36.00 to 38.00
Low phos. punch'gs, plate	33.00 to 34.00
Low phos. 3 ft and under	32.00 to 33.00
No. 1 RR. hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	34.00 to 35.00
Rerolling rails	37.00 to 39.00
Rails 2 ft and under	42.00 to 43.00
Locomotive tires, cut	33.00 to 35.00
Cut bolsters & side frames	35.00 to 36.00
Angles and splice bars	36.00 to 38.00
RR. steel car axles	38.00 to 39.00
RR. couplers and knuckles	33.00 to 35.00
No. 1 machinery cast.	39.00 to 40.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	30.00 to 32.00
Cast iron brake shoes	35.00 to 37.00
Cast iron car wheels	33.00 to 35.00
Malleable	40.00 to 41.00
Stove plate	29.00 to 31.00

Philadelphia Area

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	21.00 to 22.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Mixed bor. short turn.	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Shoveling turnings	15.00 to 16.00
Clean cast chem. borings.	24.00 to 25.00
Low phos. 5 ft and under	24.00 to 26.00
Low phos. 2 ft and under	25.00 to 27.00
Low phos. punch'gs	25.00 to 27.00
Elec. furnace bundles	23.00 to 24.00
Heavy turnings	20.00 to 21.00
RR. steel wheels	29.00 to 30.00
RR. spring steel	29.00 to 30.00
Rails 18 in. and under	39.00 to 40.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	35.50 to 36.50
Cast iron carwheels	38.00 to 39.00
Malleable	38.00 to 39.00
Unstripped motor blocks.	27.00 to 28.00
No. 1 machinery cast.	39.00 to 40.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	11.00 to 12.00
Mixed bor. and turn.	14.50 to 15.50
Shoveling turnings	14.50 to 15.50
Cast iron borings	14.50 to 15.50
Cut struct'r'l plate, 2 ft & under	31.50 to 32.50
Drop forge flashings	25.00 to 26.00
Low phos. 2 ft & under	26.00 to 27.00
No. 1 RR. heavy melting	27.00 to 28.00
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	44.00 to 45.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	39.00 to 40.00
No. 1 machinery cast.	40.00 to 41.00
Stove plate	33.00 to 34.00
Malleable	39.00 to 40.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	17.50 to 18.50
Cast iron borings	17.50 to 18.50
Low phos. plate	31.00 to 32.00

Buffalo

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	19.50 to 20.50
No. 1 busheling	23.00 to 24.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.50 to 18.50
Machine shop turn.	14.00 to 14.50
Mixed bor. and turn.	16.50 to 17.00
Shoveling turnings	17.50 to 18.00
Cast iron borings	16.50 to 17.00
Low phos. plate	27.00 to 28.00
Scrap rails, random, lgth.	33.00 to 34.00
Rails 2 ft and under	40.00 to 41.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	39.00 to 40.00
No. 1 cupola cast.	36.00 to 37.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$16.00 to $17.00
No. 2 hvy. melting	14.00 to 15.00
No. 1 bundles, openhearth	17.50 to 18.50
No. 2 bundles	14.00 to 15.00
New busheling	16.00 to 17.00
Drop forge flashings	16.00 to 17.00
Machine shop turn.	6.00 to 7.00
Mixed bor. and turn.	8.00 to 9.00
Shoveling turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
Low phos. punch's, plate	17.00 to 18.00
No. 1 cupola cast.	35.00
Heavy breakable cast.	24.00
Stove plate	28.00
Automotive cast.	35.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	24.25 to 25.25
No. 1 bundles	25.00 to 26.00
No. 2 bundles	19.50 to 20.50
Machine shop turn.	10.00 to 11.00
Cast iron borings	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
No. 1 RR. hvy. melting	29.00 to 30.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	39.00 to 40.00
Locomotive tires, uncut	29.00 to 30.00
Angles and splice bars	30.50 to 32.00
Std. steel car axles	35.00 to 36.00
RR. spring steel	31.50 to 32.50
Cupola cast.	39.00 to 40.00
Hvy. breakable cast.	23.00 to 24.00
Cast iron brake shoes	30.00 to 31.00
Stove Plate	34.00 to 35.00
Cast iron car wheels	30.00 to 31.00
Malleable	34.00 to 35.00
Unstripped motors blocks	27.00 to 28.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00 to $14.00
No. 2 hvy. melting	11.00 to 12.00
No. 2 bundles	9.00 to 10.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and turn.	6.00 to 7.00
Shoveling turnings	7.00 to 8.00
Clean cast chem. borings.	18.00 to 19.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstripped motor blocks.	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	20.00
No. 2 bundles	$15.00 to 16.00
No. 1 busheling	20.00
Machine shop turn.	13.00
Shoveling turnings	15.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	25.00 to 26.00
Bar crops and plate	28.00 to 29.00
Structural and plate, 2 ft	28.00 to 29.00
No. 1 RR. hvy. melting	24.00 to 25.00
Scrap rails, random lgth.	32.00 to 33.00
Rails, 18 in. and under	37.00 to 38.00
Angles & splice bars	35.00 to 36.00
Rerolling rails	33.00 to 34.00
No. 1 cupola cast.	40.00 to 41.00
Stove plate	37.00 to 38.00
Cast iron car wheels	33.00 to 34.00
Charging box cast.	23.00 to 24.00
Heavy breakable	24.00 to 25.00
Unstripped motor blocks.	31.00 to 32.00
Mashed tin cans	14.00 to 15.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$14.00 to $16.00
No. 2 hvy. melting	11.00 to 13.00
No. 1 bundles	13.00 to 14.00
No. 2 bundles	9.00 to 11.00
No. 1 busheling	12.50 to 13.50
Elec. furnace, 3 ft & under	14.00 to 16.00
Machine shop turn.	1.00 to 1.50
Mixed bor. and short turn.	6.00 to 7.00
Shoveling turnings	7.00 to 7.50
Clean cast chem. borings.	13.00 to 14.00
No. 1 machinery cast.	27.00 to 28.00
Mixed cupola cast.	25.00 to 26.00
Heavy breakable cast.	25.00 to 25.50
Stove plate	22.00 to 23.00
Unstripped motor blocks.	7.00 to 8.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	11.00 to 11.50
Shoveling turnings	13.00 to 14.00
Cast iron borings	11.00 to 11.50
Low phos., 18 in. & under	31.00 to 32.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	43.00 to 44.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	42.00 to 43.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	$39.00 to 40.00

Los Angeles

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	17.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Shoveling turnings	$7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under.	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	37.00 to 38.00

Seattle

No. 1 hvy. melting	$23.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	16.00
No. 3 bundles	12.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd.	20.00
Bush., new fact unprep'd.	16.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, remelting	31.00
Cast scrap	$42.00 to 45.00

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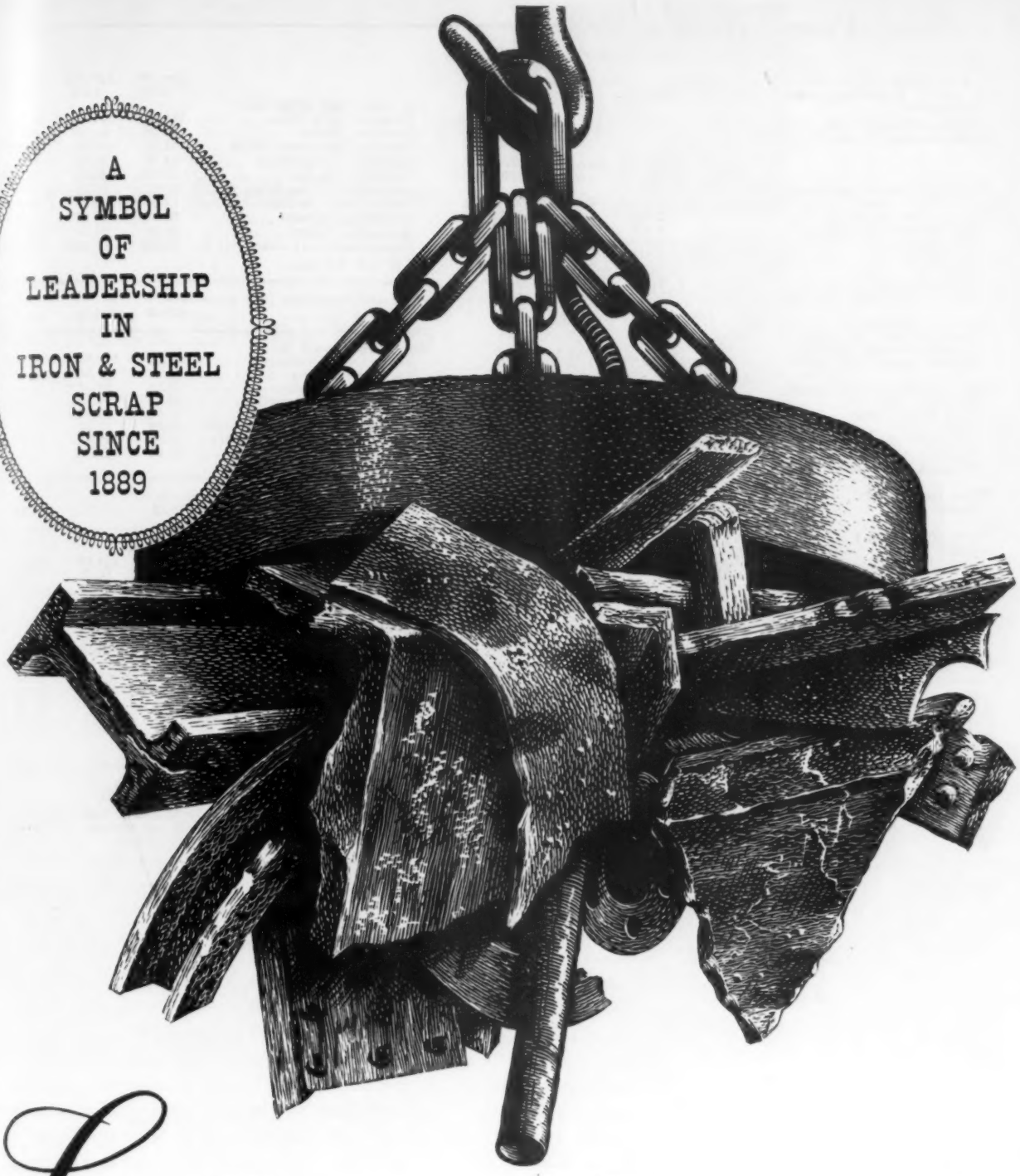
1889



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Comparison of Prices

(Effective Apr. 20, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Apr. 20 1954	Apr. 13 1954	Mar. 23 1954	Apr. 21 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.513	5.513	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl'a C-R strip (No. 302)	41.50	41.50	41.50	38.48
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16¢	4.16¢	4.16¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	32.98
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.225¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.376¢

	Apr. 20 1954	Apr. 13 1954	Mar. 23 1954	Apr. 21 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$60.69
Foundry, Valley	56.50	56.50	56.50	55.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	58.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	55.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	8.00¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$55.74
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$26.50	$26.50	$25.50	$42.50
No. 1 steel, Phila. area	21.50	21.50	22.00	42.50
No. 1 steel, Chicago	29.00	27.50	25.00	38.00
No. 1 bundles, Detroit	18.00	17.50	16.50	40.50
Low phos., Youngstown	31.50	31.50	27.50	49.50
No. 1 mach'y cast, Pittsburgh	42.50	41.50	41.50	50.50
No. 1 mach'y cast, Philadel'a	39.50	39.50	38.50	47.50
No. 1 mach'y cast, Chicago	39.50	39.50	36.50	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$25.67	$25.17	$24.17	$41.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.71
Foundry coke, prompt	16.75	16.75	16.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	29.875‡	30.00‡
Copper, Lake, Conn.	30.00	30.00	30.00	32.25
Tin Straits, New York	97.00†	99.50*	95.00	94.50
Zinc, East St. Louis	10.25	10.25	9.75	11.00
Lead, St. Louis	13.80	13.80	12.80	11.80
Aluminum, virgin ingot	21.50	21.50	21.50	20.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on p. 271 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.25	61.75	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	58.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct., $2 per ton for .05 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1* $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct. manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50-20.75	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50-46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75-59.00	45.75-46.00	51.25	30.00	30.50-31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.25-64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2, J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1, F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*, Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

Stainless Steel here...

and Stainless Steel here...

HELP RESIST HEAT HERE

To withstand the scorching blasts that thunder through them, jet engine tailpipes and exhaust cones are made of Republic ENDURO Stainless and Heat-Resisting Steel.

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REPUBLIC STEEL

REPUBLIC ENDURO STAINLESS STEEL

Other Republic Products include Carbon and Alloy Steels—Pipe, Sheets, Strip, Plates, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

STEEL PRICES

(Effective Apr. 20, 1954)

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		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$82.00 *B3*		4.15 *B3*	6.20 *B3*	4.15 *B3*						
	Buffalo, N. Y.	$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*	4.925 *B3*	4.15 *B3*	6.20 *B3*	4.15 *B3*	3.925 *B3, R3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Claymont, Del.													
	Conshohocken, Pa.													
	Coatesville, Pa.								4.05 *A2*		5.90 *A2*			
	New Bedford, Mass.									6.00 *R6*				
	Harrison, N. J.													12.00 *C11*
	Johnstown, Pa.	$62.00 *B3*	$75.50 *B3*	$82.00 *B3*		4.15 *B3*	6.20 *B3*							
	Fairless, Pa.													
	New Haven, Conn.									5.90 *D1* 6.20 *A5*				
	Phoenixville, Pa.					4.15 *P2*		4.95 *P2*						
	Sparrows Pt., Md.								3.925 *B3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Wallingford, Conn.									5.90 *W1*				
	Worcester, Mass.									6.30 *A5*				12.30 *A5* 12.45 *N7*
MIDDLE WEST	Alton, Ill.								4.10 *L1*					
	Ashland, Ky.								3.925 *A7*					
	Canton-Massillon, Dover, Ohio			$82.00 *R3, T5*										12.00 *G4*
	Chicago, Ill.	$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*	4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	4.10 *U1*	3.925 *A1, W8*	5.70 *A1*	5.95 *R3*		6.40 *W8*	
	Sterling, Ill.													
	Cleveland, Ohio		$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*		12.00 *A5* 12.15 *N7*
	Detroit, Mich.			$84.00 *R5*					4.125 *G3* 4.15 *M2*	5.65 *D1, D2, G3, M2, P11*	6.15 *G3*	7.90 *D2* 8.35 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*	4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*		3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*		6.40 *U1*	
	Granite City, Ill.													
	Indianapolis, Ind.									5.60 *C5*				
	Mansfield, Ohio													
	Middletown, Ohio									5.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								3.925 *S1*	5.45 *S1, T4*	5.95 *S1*	7.65 *S1*	6.40 *S1*	12.00 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$62.00 *U1, J3*	$75.50 *J3, U1*	$82.00 *U1, C11*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.10 *U1*	3.925 *A7, P6* 3.95 *S7* 4.425 *S9*	5.45 *B4, J3, S7*		7.80 *J3*	6.40 *S9* 6.45 *S7*	12.00 *S9* 12.15 *S7*
	Portsmouth, Ohio								3.925 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.10 *W3*			3.925 *W3*	5.45 *F3, W3*	5.95 *W3*	8.15 *W3*		
	Youngstown, Ohio			$82.00 *Y1, C10*		4.10 *Y1*	6.675 *Y1*		3.925 *R3, U1, Y1*	5.45 *R3, Y1, C5*	5.95 *U1, R3* 6.45 *Y1*	7.60 *R3* 8.30 *Y1*	6.40 *U1*	12.00 *C5*
WEST	Fontana, Cal.	$70.00 *K1*	$83.50 *K1*	$101.00 *K1*		4.75 *K1*	6.825 *K1*	5.10 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*		7.80 *K1*	13.65 *K1*
	Geneva, Utah		$75.50 *C7*			4.10 *C7*	6.175 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.775 *S2*		4.525 *S2*		6.55 *S2*		7.00 *S2*	
	Los Angeles, Torrance, Cal.		$85.00 *B2*	$102.00 *B2*		4.80 *B2, C7*	6.85 *B2*		4.675 *B2, C7*	7.50 *C1*			7.60 *B2*	
	Minnequa, Colo.					4.55 *C6*			5.025 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$85.00 *B2*			4.75 *B2* 4.91 *P9*	6.80 *B2*		4.675 *B2, C7*					
	Seattle, Wash.		$89.00 *B2*			4.85 *B2*	6.90 *B2*							
SOUTH	Atlanta, Ga.								4.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$62.00 *T2*	$75.50 *T2*			4.10 *R3, T2*	6.175 *T2*		3.925 *R3, T2, C16*		5.95 *T2*			
	Houston, Tex.		$83.50 *S2*	$90.00 *S2*		4.50 *S2*			4.325 *S2*				6.80 *S2*	

IRON AGE

STEEL PRICES

(Effective Apr. 20, 1954)

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		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes° *1.25*-lb. base box	Electro° *0.25*-lb. base box	Hollowware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*			
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	3.975 *A2*					5.90 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										4.525 *B3*			
	Fairless, Pa.	3.975 *U1*	4.825 *U1*				5.95 *U1*	7.275 *U1*				$8.80 *U1*	$7.50 *U1*	
	New Haven, Conn.													
	†Phoenixville, Pa.													
	Sparrows Pt., Md.	3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*	
	Worcester, Mass.										4.825 *A5*			
	Trenton, N. J.													
MIDWEST	Alton, Ill.										4.70 *L1*			
	Ashland, Ky.	3.925 *A7*		5.275 *A7*	5.175 *A7*									
	Canton-Massillon, Dover, Ohio			5.275 *R1, R3*						5.05 *R1*				
	Chicago, Joliet, Ill.	3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*			
	Sterling, Ill.										4.625 *N4*			
	Cleveland, Ohio	3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*			
	Detroit, Mich.	4.125 *G3* 4.15 *M2*	4.975 *G3*				6.10 *G3*	7.425 *G3*						
	Newport, Ky.	3.925 *N5*												
	Gary, Ind. Harbor, Indiana	3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1, I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*
	Granite City, Ill.	4.125 *G2*	4.975 *G2*	5.475 *G2*	5.375 *G2*								$7.60 *G2*	6.30 *G2*
	Kokomo, Ind.	4.025 *C9*		5.375 *C9*						5.025 *C9*	4.625 *C9*			
	Mansfield, Ohio					5.675 *E2*				5.05 *E2*				
	Middletown, Ohio		4.775 *A7*		5.175 *A7*	5.675 *A7*								
	Niles, Ohio Sharon, Pa.	3.925 *S1* 5.175 *N3*	5.80 *N3*	5.275 *N3*	6.525 *N3*	5.45 *S1* 5.675 *N3*	5.90 *S1*						$7.40 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	3.925 *J3, U1, P6, A7*	4.775 *J3, U1, P6*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.225 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*
	Portsmouth, Ohio	3.925 *P7*	4.775 *P7*								4.525 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	3.925 *W3, W5*	4.775 *W3, W5, F3*	5.275 *W3, W5*		5.675 *W3, W5*	5.90 *W3*	7.225 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*
	Youngstown, Ohio	3.925 *R3, U1, Y1*	4.775 *R3, Y1*		5.175 *Y1*		5.90 *U1, R3* 6.40 *Y1*	7.225 *R3* 7.725 *Y1*			4.525 *Y1*	$8.70 *R3*		
WEST	Fontana, Cal.	4.70 *K1*	5.875 *K1*				6.675 *K1*	8.275 *K1*			5.325 *K1*			
	Geneva, Utah	4.025 *C7*												
	Kansas City, Mo.									4.775 *C6*	4.865 *S2*			
	Los Angeles, Torrance, Cal.	4.625 *C7*		6.275 *C7*							5.325 *B2*			
	Minnequa, Colo.										4.775 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	4.625 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2* *R3*	$8.80 *T2*	$7.50 *T2*	
	Houston, Texas	4.325 *S2*									4.925 *S2*			

† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box.

° COKES: 1.50-lb add 25¢.

ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢; 1.00-lb add $1.20.

IRON AGE

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		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'rs. Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3* 4.18 *R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3,B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.10 *C4*		5.55 *C4*		
	Coatesville, Pa.							4.10 *L4*		5.55 *L4*		
	Conshohocken, Pa.							4.10 *A2*	5.15 *A2*		6.25 *A2*	
	Harrisburg, Pa.							4.10 *C3*	5.15 *C3*			
	Hartford, Conn.			5.75 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Fairless, Pa.	4.30 *U1*	4.30 *U1*		5.025 *U1*							
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.625 *B3*
	Palmer, Worcester, Mansfield, Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.525 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.	4.35 *L1*										5.70 *L1*
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio			5.20 *R2,R3*	4.875 *R3,T5*	6.325 *R2,R3, T5*						
	Chicago, Joliet, Ill.	4.15 *U1, N4,W8* 4.22 *R3*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2, R3,B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A1, R3,N4,W1*
	Cleveland, Ohio	4.21 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5, C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, R3,C13*
	Detroit, Mich.	4.30 *R5* 4.35 *G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	4.975 *R5* 5.075 *G3*	6.425 *R5* 6.475 *P8* 6.525 *B5,P3*	6.425 *G3*	4.30 *G3*			6.45 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.20 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.30 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.55 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5, J3, W10,R3,C8*	4.875 *U1,C11*	6.325 *A5,C11, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.525 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.15 *W3*						4.10 *W3*				
	Youngstown, Ohio	4.15 *U1,Y1* 4.20 *R3*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1,Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *R3, U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.75 *S2*	4.75 *S2*		5.475 *S2*		6.825 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3*	5.925 *B2*		6.925 *B2*					6.475 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6*	4.90 *B2*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.35 *A8*	4.35 *A8*									5.725 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.15 *T2,C16* 4.18 *R3*	4.15 *R3,T2, C16*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.275 *S2*			4.50 *L3, S2*				5.925 *S2*

Steel Prices

(Effective Apr. 20, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Fred Ulbrich & Sons, Wallingford, Conn.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
STANDARD T. & C.																						
Sparrows Pt. *B3*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. *L1*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	24.25	.....	27.25	.....	29.75	.....	32.25	.....	32.75	.....	33.25	.....	34.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling *W5*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor *Y1*	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	16.75	.....	20.75	.....	22.75	.....	23.25	.....	23.75	.....	24.25	.....	24.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. *L1*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling *W5*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor *Y1*	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ⅜ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pts. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 10.25¢.

Steel Prices

(Effective Apr. 20, 1954)

To identify producers, see Key on preceding page.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	4.325	5.20	5.275				
So. Chicago *R3*				7.05			
Cleveland *R3*							
Ensley *T2*	4.325	5.20					
Fairfield *T2*		5.20		7.05		5.125	
Gary *U1*	4.325	5.20				5.125	
Ind. Harbor *I3*	4.325		5.275	7.05		5.125	
Johnstown *B3*		5.20					
Joliet *U1*		5.20	5.275				
Kansas City *S2*				7.30			11.00
Lackawanna *B3*	4.325	5.20	5.275			5.125	
Lebanon *B3*				7.05	10.50		11.00
Minnequa *C6*	4.325	5.70	5.275	7.05		5.125	11.00
Pittsburgh *O1*					10.50		11.00
Pittsburgh *P5*					10.50		11.00
Pittsburgh *J3*				7.05			
Pitt'g, Cal. *C7*						5.275	
Seattle *B7*				7.55		5.275	11.50
Steelton *B3*	4.325		5.275			5.125	
Struthers *Y1*							
Torrance *C7*						5.275	
Youngstown *R3*				7.05			

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Fully Processed
Field		8.05	
Armature	8.15	8.40	8.90
Elect.	8.75	9.00	9.50
Motor	9.75	10.00	10.50
Dynamo	10.65	10.90	11.40
Trans. 72	11.60	11.85	12.35
Grain Oriented			
Trans. 65	12.15		
Trans. 58	12.65	Trans. 80	16.25
Trans. 52	13.65	Trans. 73	16.75

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*32.7	
Washington, Pa., *J2*	....	
Claymont, Del., *C4*	....	
New Castle, Ind., *I2*	....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa., *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	38.90	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9–15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Annl'd ¢/lb.	Merch. Wire* Galv. ¢/lb.
Alabama City *R3*	131	140	...	149	153	6.675	7.075
Aliquippa, Pa. *J3*	131	143			150	6.675	7.20
Atlanta *A8*	133	145	...	151	158	6.775	7.30
Bartonville *K2*	133	144			157	6.775	7.275
Buffalo *W6*							
Chicago, Ill. *N4*	131	143	...	149	156	6.675	7.20
Cleveland *A6*	137						
Cleveland *A5*						6.675	
Crawfordsville *M4*	133	145	...	151	153	6.775	7.325
Donora, Pa. *A5*	131	140	...	149	153	6.675	7.075
Duluth *A5*	131	140	145	149	153	6.675	7.075
Fairfield, Ala. *T2*	131	140	...	149	153	6.675	7.075
Galveston *D4*	139	148					
Houston *S2*	139	148			161	7.075	7.475
Johnstown, Pa. *B3*	131	143	145		156	6.675	7.225
Joliet, Ill. *A5*	131	140	...	149	153	6.675	7.075
Kokomo, Ind. *C9*	133	142	...	151	155	6.775	7.175
Los Angeles *B2*						7.625	
Kansas City *S2*	143	152	...	161	165	7.275	7.675
Minnequa *C6*	136	148	150	154	162	6.925	7.325
Monessen *P6*	131	145	...	...	157	6.675	7.225
Moline, Ill. *R3*			145				
Pittsburg, Cal. *C7*	150	163	...	173	173	7.625	8.025
Portsmouth *P7*						6.675	
Rankin, Pa. *A5*	131	140			153	6.675	7.075
So. Chicago *R3*	131	140	145	149	153	6.675	7.075
S. San Francisco *C6*					173		
Sparrows Pt. *B3*	133	...	...	151	158	6.775	7.325
Struthers, O. *Y1*						6.675	7.175
Worcester *A5*	137					6.975	
Williamsport, Pa. *S10*	133		158				

Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7**	5.75	7.65	8.60	10.55	12.85
Carnegie, Pa. *S9*	....	7.65	8.60	10.55	12.85
Cleveland *A5*	5.45	7.65	8.60	10.55	12.85
Detroit *D1*	5.65	7.85	8.80	10.55	.....
Detroit *D2*	5.65	7.85	8.80		
Harrison, N. J. *C11*			8.90	10.85	13.15
Indianapolis *C5*	5.60	7.80	8.60	10.55	.....
New Castle, Pa. *B4*	5.80	8.00	8.60		
New Haven, Conn. *D1*	5.90	7.95	8.90	10.85	
Riverdale, Ill. *A1*	5.70	7.80	8.75	10.70	13.00
Sharon, Pa. *S1*	5.45	7.65	8.60	10.55	12.85
Trenton *R4*		7.95	8.90	10.85	13.15
Wallingford *W1*	6.20	7.95	8.90	10.85	13.15
Warren, Ohio *T4*	5.45	7.65	8.60	10.55	12.85
Weirton, W. Va. *W3*	5.45	7.65	8.60	10.55	12.85
Worcester, Mass. *A5*	6.30	7.95	8.90	10.85	13.15
Youngstown *C5*	5.45	7.65	8.60	10.55	.....

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	27.34	32.98	26.51	31.98
	2½	12	36.82	44.41	35.70	43.07
	3	12	42.52	51.28	41.23	49.73
	3½	11	49.63	59.87	48.13	58.06
	4	10	65.91	79.50	63.92	77.10
National Tube	2	13	....	32.98	26.51	....
	2½	12	36.82	44.41	35.70	....
	3	12	42.52	51.28	41.23	....
	3½	11	49.63	59.87	48.13	....
	4	10	65.91	79.50	63.92	....
Pittsburgh Steel	2	13	27.34	32.98	....	....
	2½	12	36.82	44.41	....	....
	3	12	42.52	51.28	....	....
	3½	11	49.63	59.87	....	....
	4	10	65.91	79.50	....	....

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A-4615 As rolled	Alloy Bars: Hot-Rolled A-4140 Annealed	Alloy Bars: Cold-Drawn A-4615 As rolled	Alloy Bars: Cold-Drawn A-4140 Annealed
Baltimore	$.20	6.20	7.12–7.64	7.36–7.78	7.00	.....	6.85	6.98	6.86	8.17	.....	.....	.....	.....
Birmingham	.15	6.10	7.00	8.00[4]	6.30	.....	6.35	6.35	6.15	8.90	.....	.....	.....	.....
Boston	.20	6.99	7.83–8.38	9.18	7.13	9.35[2]	7.13	7.06	6.87	8.35	12.40	11.94–12.28	14.65	14.55–14.58
Buffalo	.20	6.18–6.20	7.15	8.70	6.65–6.79	.....	6.65–6.68	6.55–6.59	6.35	7.70	.....	11.95–12.15	14.45	14.25–14.55
Chicago	.20	6.18	7.12	8.00	6.42	.....	6.33	6.46	6.28	7.30	.....	11.60	.....	14.05
Cincinnati	.20	6.30	7.11	.....	6.66	.....	6.62	6.93	6.52	7.60	.....	11.85	.....	14.30
Cleveland	.20	6.18	7.12	7.90–8.25	6.58	.....	6.50	6.79	6.34	7.40	12.04	11.74	14.29	14.19
Denver		7.95	8.85	10.45–10.47	8.20	9.55	7.95	7.95	8.05	9.05	.....	.....	.....	15.75
Detroit	.20	6.35–6.45	7.29–7.31	8.42	6.69–7.71	7.36	6.80	6.91–6.93	6.56	7.60	12.47	11.92	14.42	13.44–14.62
Houston	.20	7.15	7.45–7.60	9.23	7.45	.....	7.20	7.35	7.45	9.30–9.40	.....	12.80	.....	.....
Kansas City	.20	6.85	.....	.....	7.09	.....	7.00	7.13	6.95	8.07	.....	.....	.....	.....
Los Angeles	.20	7.25	9.00	9.35	7.55	.....	7.20	7.35	7.15	9.10–9.75	.....	12.90	.....	15.90
Memphis	.10	6.79	7.60	.....	6.90	.....	7.01	7.09	6.88	7.89–8.76	.....	.....	.....	.....
Milwaukee	.20	6.35	7.29	8.17	6.59	.....	6.50	6.63	6.45	7.57	.....	11.77	.....	14.22
New Orleans	.15	6.51	7.41	.....	6.63	.....	6.73	6.81	6.60	8.37	.....	.....	.....	.....
New York	.30	6.78	7.75–8.37	8.41[7]–8.42	7.16	9.15[8]	6.99	6.90	7.06	8.43	12.29	11.99	14.54	14.44
Norfolk	.20	6.90	.....	.....	7.00	.....	7.00	7.00	7.00	8.50	.....	.....	.....	.....
Philadelphia	.25	6.35–6.53	7.13	7.87	7.02	.....	6.63	6.67	6.87	8.19	.....	11.74	.....	14.19
Pittsburgh	.20	6.18	7.12	8.30	6.55	.....	6.33	6.46	6.28	7.65	.....	11.60	.....	14.05
Portland	.10	7.90–8.75	8.45–9.75	9.05–9.15	7.65	.....	7.30	7.25	7.35	10.65	.....	.....	.....	.....
Salt Lake City	.20	8.60	10.50	10.50[3]	9.25	.....	8.10	8.25	9.20	11.25	.....	.....	.....	.....
San Francisco	.20	7.35	8.70	10.15	7.60	.....	7.20	7.25	7.15	9.75	.....	12.90	.....	15.90
Seattle	.20	7.95–8.15	9.30–9.50	9.80	7.80–8.00	.....	7.40–7.60	7.30–7.50	7.40–7.60	10.45–10.65	.....	13.15	.....	15.60
St. Louis	.20	6.48	7.42	8.25–8.30	6.72	7.70–8.53	6.73	6.85	6.58	7.70	12.20	11.90	14.45	14.30–14.35
St. Paul	.15	6.84	7.78–8.33	8.66	7.08	13.22	6.99	7.12	6.94	8.06	.....	12.42	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over. (6)400 to 1499 lb. (7)1500 to 3499 lb. (8)2000 to 5999 lb.

—Miscellaneous Prices—

(Effective Apr. 20, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.48
18	4	1	—	5	2.16
18	4	2	—	—	1.64
18	4	1.5	8	—	.895
1.5	4	2	6	—	1.005
6	4	2	6	—	.70

High-carbon chromium ..... .70
Oil hardened manganese ..... .39
Special carbon ..... .355
Extra carbon ..... .30
Regular carbon ..... .25

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y...	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50

6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less ..... $129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed

GRAPHITE			CARBON		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	20.50	40	100, 110	8.95
20	72	20.00	35	110	8.95
12 to 18	72	20.50	30	110	8.95
7 to 10	60	21.00	24	72 to 84	9.10
6	60	23.25	20	90	8.95
4	40	26.00	17	72	9.10
3	40	27.25	14	72	9.50
2½	30	26.00	10, 12	60	10.30
2	24	43.50	8	60	10.55

Got a Perforating Problem?
See Hendrick for the solution!

Sometimes the quickest, surest answer to design problems is very simple. In numerous cases, the inclusion of a pleasing pattern of perforations is just what is needed to make products more attractive and saleable. And whatever material you're using—be it metal, masonite, rubber, plastic, hard or insulated board for decorative display or fabricating purposes, Hendrick can help you.

For many years Hendrick has been building up the largest stock of dies commercially available. If you are faced with the need for bringing newer, more modern design elements into your products, Hendrick's long experience and perforating facilities can be yours for the asking. Write for more information, today.

Hendrick
MANUFACTURING COMPANY

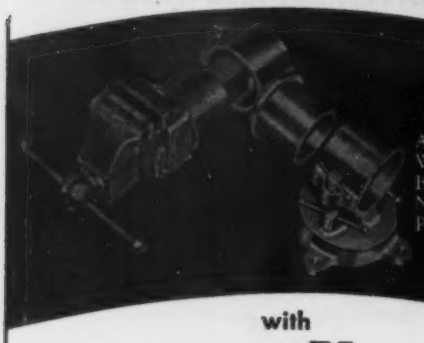
37 DUNDAFF ST., CARBONDALE, PA. • ***Sales Offices In Principal Cities***
Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

Everybody knows this sign
stands for money
...and smart gear buyers
know this sign CINTI stands for
the best in custom gears.

CINTI "Gears... Good Gears Only"

THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

Cut Production Time and Costs



A Production Worker on the Bench Who is Never on Your Payroll!

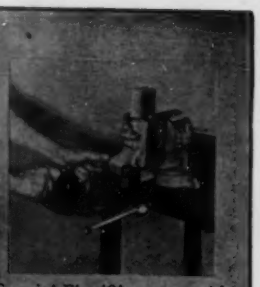
with

FLEXIVISE

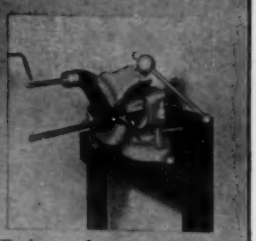
A revolutionary development that saves time, labor and fatigue. Provides complete rotation of 360° in any direction. Positions work to the operator, saving time, labor and physical fatigue. Flexivise is exactly what the name implies; a flexible vise providing a greater range and greater efficiency. 4" jaw width, 5½" jaw opening. Write or wire now for complete information.

FLEXIVISE COMPANY

1149 E. Pico Blvd., Los Angeles, Calif.



Special FlexiSleeve provides a vertical rotation.



Work can be rotated a full 360° and locked in any position.

Large unwieldly pieces can be held securely by Flexivise.

DoALL CHATTER FREE COUNTERSINKS

produce holes with a smooth, valve-seat appearance

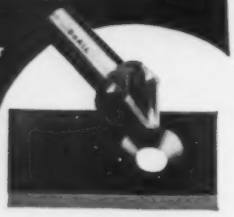
New off-center flute design

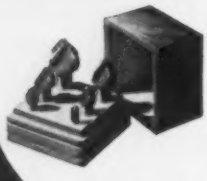
Shears metal —does not gouge

Provides faster, more accurate cutting

Lasts longer

Available in H.S. Steel and Carbide





Consult your classified phone directory for the DoALL Sales-Service Store near you.

Sets available in 60°, 82°, 90°, 100°, 120° angles

25

Call Your DoALL Service-Store

Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock

The DoALL Company, Des Plaines, Ill.

Are you selling used machinery, tools, equipment or surplus materials?

Let an advertisement in The Iron Age help speed up the process by contacting the many buyers who look here for leads.

—Miscellaneous Prices—

(Effective Apr. 20, 1954)

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List Less Keg	K.	Less Keg	K.
	Reg.		Hvy.	
½ in. & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+32*	+16*
¾ in. to 1½ in. inclusive	+8	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	33
9/16 in. & ⅝ in.	2	18	+20	net
¾ in. to 1½ in. inclusive	+6	12	+25	+4
1⅝ in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	33
9/16 in. & ⅝ in.	9	24	+3	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	23
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net

	Light	
7/16 in. & smaller	33	43
½ in. thru ⅝ in.	26	37
¾ in. to 1½ in. inclusive	18	30

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished 44½—10
Packaged, plain finish ..... 25½—10
Bulk, plain finish** 59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb

½ in. & larger $8.90

Pct Off List

7/16 in. and smaller 30

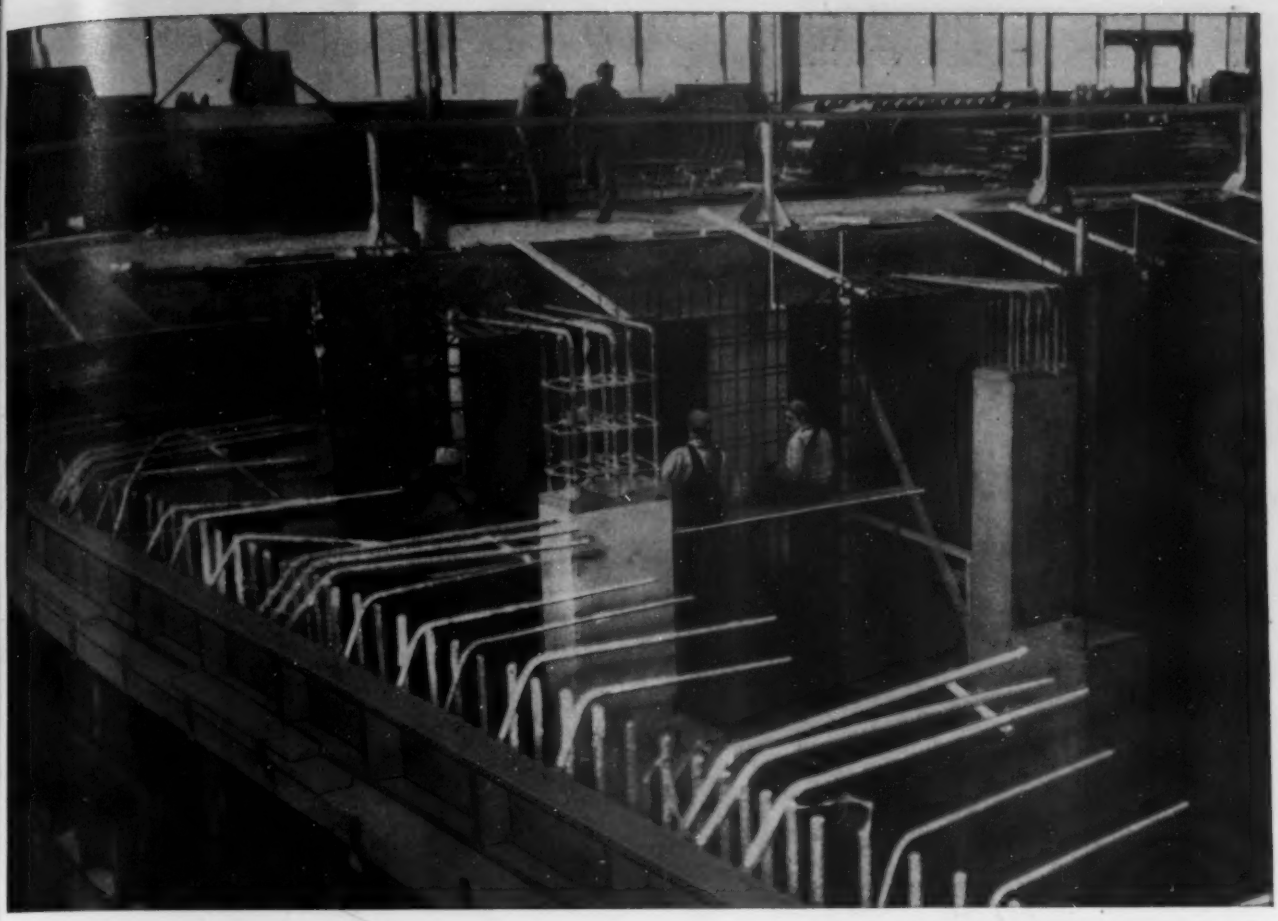
Cap and Set Screws

(In bulk) — *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¾ in. thru 1 in. up to & including 6 in.	26
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	42
¾ in. thru 1 in. up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	4	20
9/16 in. & ⅝ in. x 6 in. & shorter	5	21
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in...	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	...



It costs no more to employ a specialist!

CONSTRUCTING A DEEP FOUNDATION for a heavy press or making other alterations in a busy plant, without disrupting production, requires special skill.

Commercial Contracting Corporation excels in projects of this kind, and has built an enviable reputation for doing quality work — quickly and economically.

Every detail is planned in advance. Every contingency is analyzed. All equipment, manpower, and materials arrive at the site according to a predetermined schedule.

Only the most efficient equipment is used, and all possible precautions are taken to protect plant personnel.

Whether your project is large or small, every aspect of the work will be supervised by experts, expedited by top management.

Call Commercial Contracting Corporation to handle your own plant alterations or expansion program. You will be more than satisfied. Early consultation will often result in substantial economies.

CCC services, available to you individually or under one PACKAGE contract, include:

General Construction • Building Alterations • Demolition • Foundations • Machinery Installing Press Erecting • Crane and Conveyor Installing • Equipment Warehousing Machinery Moving • Steel Fabricating • Export Packaging

Write for complete information without obligation

COMMERCIAL CONTRACTING CORPORATION • *General Contractors*

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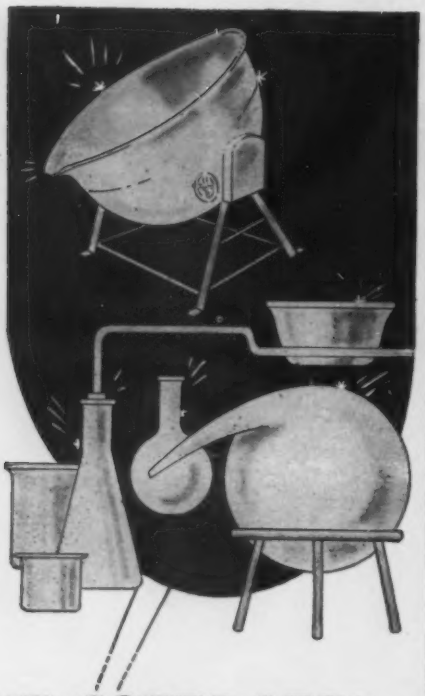

IT COSTS LESS—

to do a FASTER, EASIER, MORE EFFICIENT cleaning job on your equipment.

Whether it's glass piping systems, metal, plastic or glass lined tanks, food kettles, laboratory equipment, optical lenses, etc. ALCONOX can, and will clean thoroughly, safely and at a low cost of less than 2½ cents per gallon.

Its extremely high degree of wetting power, stability and penetration has already placed Alconox at the top of the list: Its low cost only adds to this distinction.

We invite you to check all brands and their prices. Then compare with WORLD-FAMOUS, TIME-PROVEN ALCONOX.

Convince yourself: Then place your order.

Literature, samples and the name of your nearest distributor on request.

Available in 50, 100 and 300 lb. drums

ALCONOX, INC.

WETTING AGENT DETERGENT

61-63 Cornelison Ave. Jersey City 4, N. J.

—Miscellaneous Prices—

(Effective Apr. 20, 1954)

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	16.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala	$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	131.00
California	138.00
Super Duty	
Hays, Pa., Athens, Tex., Windham	132.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick	*Per net ton*
Standard chemically bonded Balt.	$86.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	*St. %-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	38.00
in sacks	43.75

Dead Burned Dolomite	*Per net ton*
F.o.b., bulk, producing points in:	
Pa., W. Va., Ohio	$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content

72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carload lots	18.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$4.65
Zinc, 10 ton lots	17.5¢ to 25.0¢

1 way to get the right Blade—

Call your VICTOR Distributor

For over 50 years, industry has *preferred* Victor Hand, Power, and Metal and Wood Cutting Bandsaws.

Why?

Because of their consistent *quality*—the finest steels fabricated on the most modern equipment.

Because of service from local strategically located Victor Distributors—as close as your phone—who can give quick delivery from stock—who are qualified—and who have factory assistance—to help you solve your metal cutting problems.

The Victor Distributor is the place to call not only for Victor Metal Cutting Saws but also for the hundreds of other products you need regularly to keep production up and costs down.

Sold Only Through Recognized Distributors

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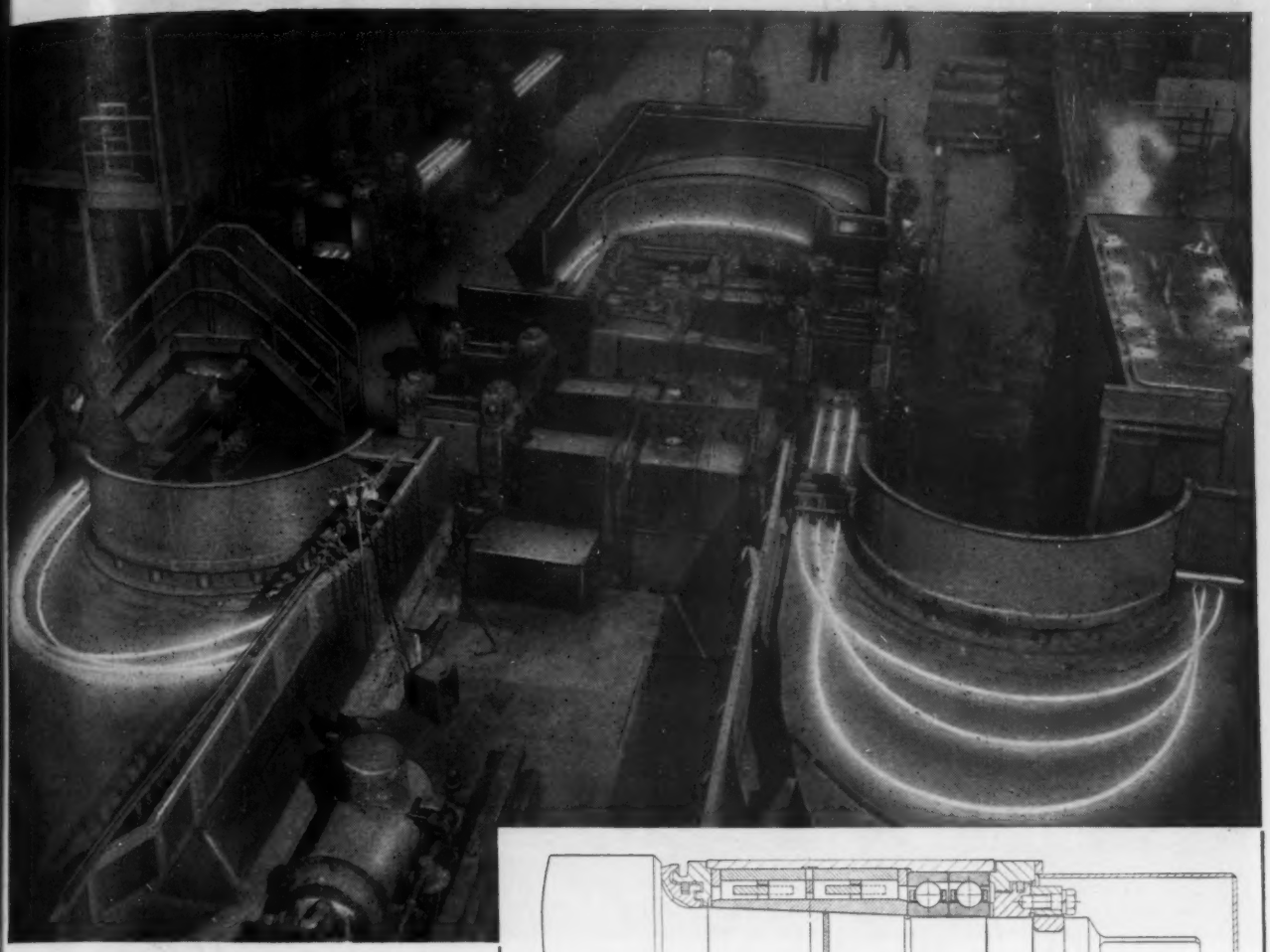
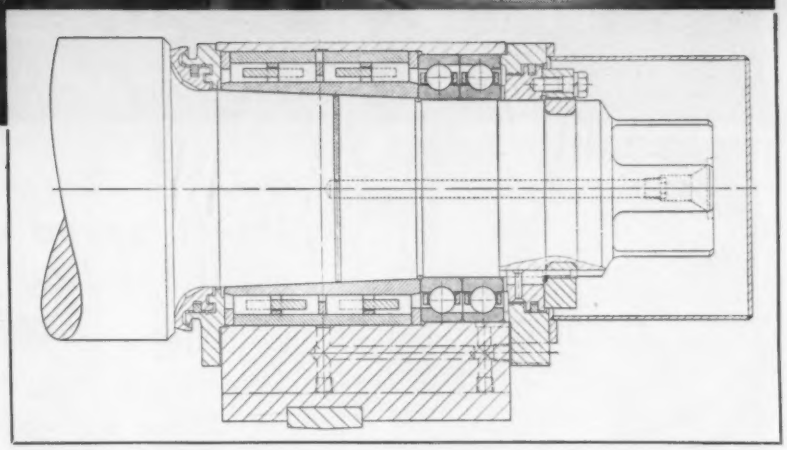
VICTOR

SAW WORKS, INC. • MIDDLETOWN, N. Y., U. S. A.

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saws.



top quality rod
at better than
50 miles per hour



SKF Roll Neck as installed in United's Rendleman Mill at Jones & Laughlin. Dotted lines show oil passages for quick, easy bearing removal by the SKF-pioneered Hydraulic Removal System.

SKF multi-row cylindrical bearings installed on the roll necks of the Jones & Laughlin Rendleman rod mill by United Engineering and Foundry Company, are doing an outstanding job at mill speeds of 4700 feet per minute.

The SKF multi-row cylindrical bearing was specifically designed for roll neck applications. This four row grease lubricated bearing incorporates all those necessary qualities for the highest standards of roll neck bearing performance long desired by mill builders.

This is another example of SKF leadership in the rolling mill field. Consult SKF and have *them* help *you* "put the right bearing in the right place."

SKF INDUSTRIES, INC., Philadelphia 32, Pa.—*manufacturers of* **SKF** *and* HESS-BRIGHT® *bearings.*

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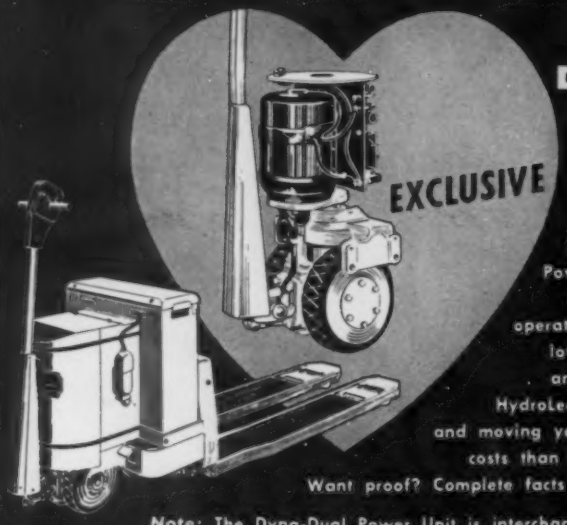
SKF®

BALL AND ROLLER BEARINGS

Heart of the HydroLectric



THE DYNA-DUAL POWER UNIT

EXCLUSIVE

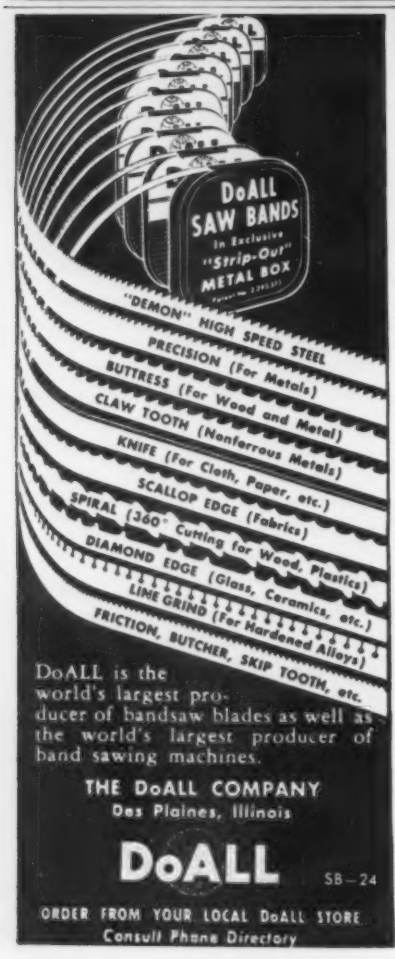
This sturdy Dyna-Dual Power Unit out performs all others for ease of operation — dependability — lowest maintenance cost and economy of power. HydroLectrics will keep rolling and moving your materials at lower costs than any truck in its class. Want proof? Complete facts and data on request.

Note: The Dyna-Dual Power Unit is interchangeable on all models.

LIFT TRUCKS INCORPORATED

2423-31 SPRING GROVE AVE. CINCINNATI 14, OHIO

There is a model for every purpose to handle any kind of material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In Exclusive "Strip-Out" METAL BOX
"DEMON" HIGH SPEED STEEL
PRECISION (For Metals)
BUTTRESS (For Wood and Metal)
CLAW TOOTH (Nonferrous Metals)
KNIFE (For Cloth, Paper, etc.)
SCALLOP EDGE (Fabrics)
SPIRAL (360° Cutting for Wood, Plastics)
DIAMOND EDGE (Glass, Ceramics, etc.)
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FRICTION, BUTCHER, SKIP TOOTH, etc.

DoALL is the world's largest producer of bandsaw blades as well as the world's largest producer of band sawing machines.

THE DoALL COMPANY
Des Plaines, Illinois

DoALL SB—24

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IT PAYS TO READ IRON AGE ADS TOO!

—Ferroalloy Prices—

(Effective Apr. 20, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered. 65-72 Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75

65-69% Cr, 4.9% C 24.75
62-66% Cr, 4.6% C, 6-9% Si 25.00

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
Carloads 25.85
Ton lots 28.00
Less ton lots 29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
0.10% max. C $1.18
0.50% max. C 1.14
9 to 11% C 1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, 24.75¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 2-in. x down, 25.05¢ per lb contained Cr plus 10.80¢ per lb contained Si. Bulk 1-in. x down, 25.25¢ per lb contained Cr plus 11.00¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump, delivered.
30-33% Cr, 60-65% Si, 3.00 max. Fe
Carloads ..... @19.00
Ton lots 22.10
Less ton lots 23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads 20.00
Ton lots 22.30
Less ton lots 23.30

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 17.50
Less ton lots 19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 16.60
Ton lots 18.10
Less ton lots 19.35

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload packed 17.50
Ton lots to carload packed 18.50
Less ton lots 20.00

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 75 pct Mn:

Producing Point	Cents per lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.00
Clairton, Pa.	10.00
Sheridan, Pa.	10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 12.50
Ton lots, packed 14.05

Dempster-Balester's Continuous Operation
shown here by Model 350 at yard Installation

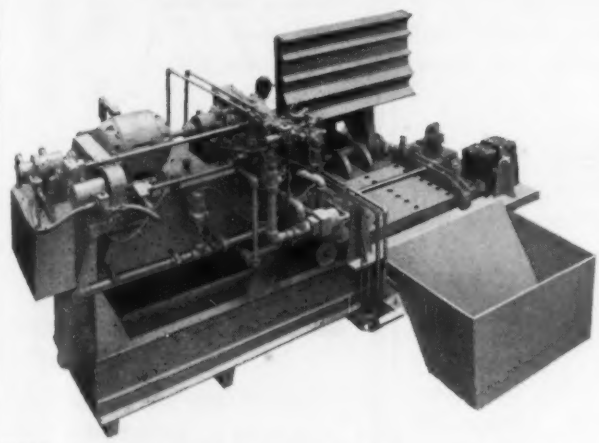
1 With the combination Skip Pan Loader and Auxiliary-Compression Door, every phase in a Dempster-Balester's baling cycle is operated by hydraulic controls from the moment scrap is dumped into Skip Pan Loader until finished bale is ejected. Here is a series of photographs made of a Dempster-Balester Model 350 in actual operation. In photo above Skip Pan is dumping scrap metal into charging box.

2 Skip Pan returns to be re-loaded. Photo above was made as the Auxiliary-Compression Door came in contact with scrap and crushes it into charging box. This door compresses scrap with one stroke . . . permitting the charging box door to close immediately. This, of course, means a tremendous increase in the speed of the baling cycle with a resultant increase in production. The slow, costly process of manually arranging scrap with the expense of extra men is completely eliminated in most every baling cycle.

3 After compressing the scrap with a 45-ton force, Auxiliary-Compression Door returns to up-right position and charging box door closes.

4 Scrap is baled and then ejected. As one cycle ends another begins. Charging box door opens and Skip Pan, which has been re-loaded, dumps another load into charging box (see photo above).

Outlined photograph at left shows a Dempster-Balester Model 350 before installation. The Dempster-Balester's 1-2-3 continuous operation has advanced the scrap metal baling industry many years ahead of normal progress. Without question, Dempster-Balesters are the fastest, most efficient presses baling scrap metal today! And you have six to choose from—three standard and three high speed models that turn out high density bales in capacities to meet any requirement. Write to us for complete information. A product of Dempster Brothers, Inc.



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—Ferroalloy Prices—

(Effective Apr. 20, 1954)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Less than 250 lb	37.00
Premium for hydrogen-removed metal	1.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk, delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton Lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	13.80
50% Si	10.80	85% Si	15.55
65% Si	12.20	90.95% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

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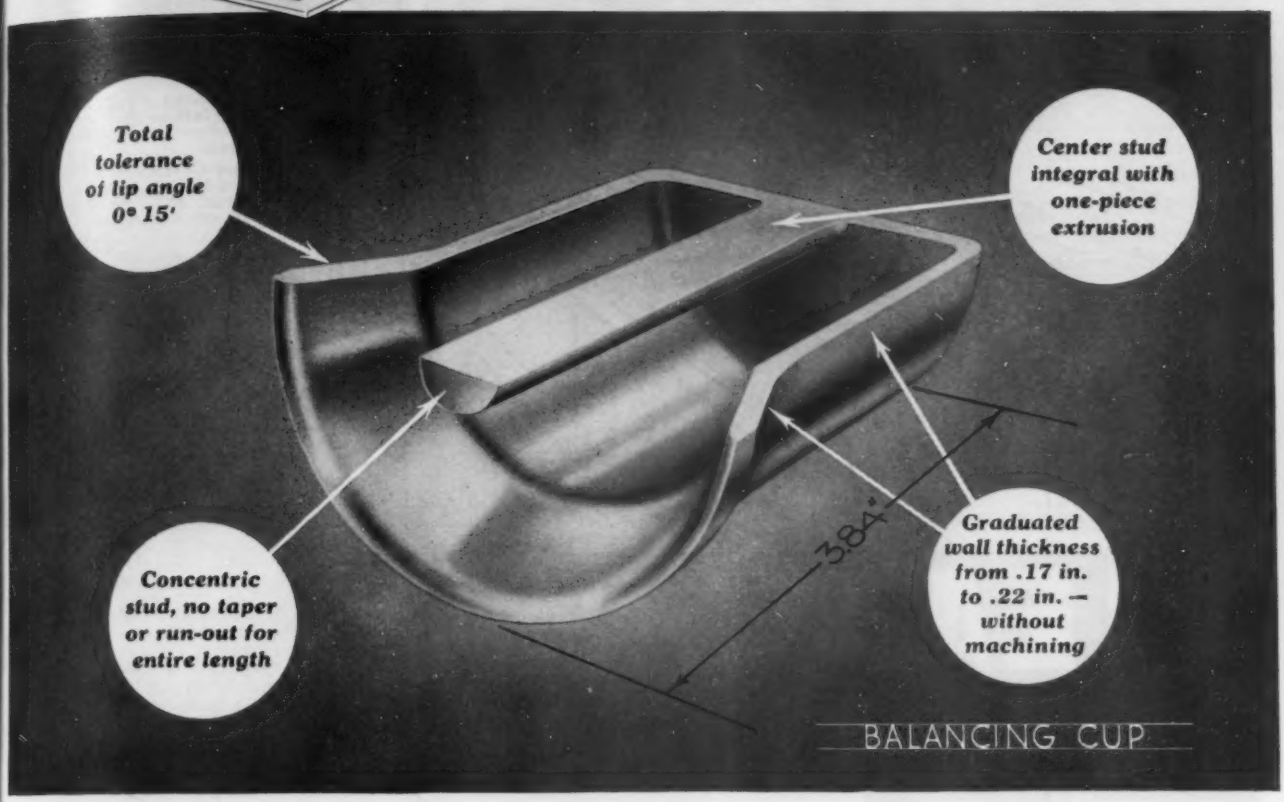
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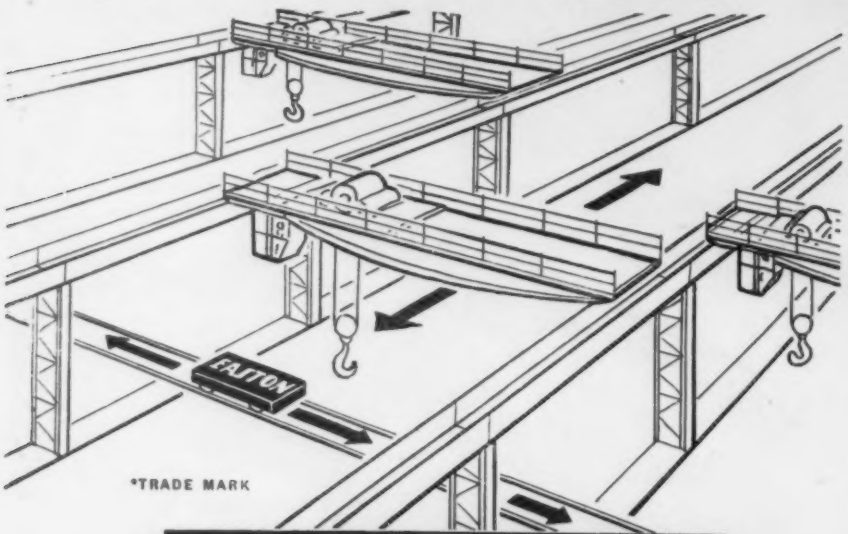

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—Ferroalloy Prices—

(Effective Apr. 20, 1954)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis f.o.b. Suspension Bridge, N. Y., per lb.
Carloads ..... 9.25¢
Ton lots 10.15

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.
Ton lots $9.50
Less ton lots 9.55

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.22

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight, allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound Contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots ... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .85
14 to 19% B 1.20
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
No. 1 ..... $1.00
No. 6 ..... 63¢
No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel - Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $2.05

Silcaz, contract basis, delivered
Ton lots ..... 45.00¢